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THE
FOUNDATIONS OF NORMAL AND ABNORMAL PSYCHOLOGY

BORIS SIDIS

Waterman.

410 Beacon Street

THE FOUNDATIONS OF NORMAL AND ABNORMAL PSYCHOLOGY

WORKS BY BORIS SIDIS

The Psychology of Suggestion.

Multiple Personality.

Psychopathological Researches.

The Psychology of Laughter.

Philistine and Genius.

An Experimental Study of Sleep.

The Foundations of Normal and
Abnormal Psychology.

Symptomatology, Psychognosis,
and Diagnosis of Psychopathic Maladies.

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of Psychopathic Diseases.

THE FOUNDATIONS OF NORMAL AND ABNORMAL PSYCHOLOGY

BY

BORIS SIDIS, A. M., Ph.D., M. D.

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The Gorham Press, Boston, U. S. A

To the Memory of My Master and Friend

WILLIAM JAMES

Who, being the foremost pioneer in the vast domain of
the human mind, has generously encouraged others
in their efforts at clearing fresh trails, leading
to an ever more comprehensive view of
the rich varieties of mental life.

PREFACE

In this volume I made an attempt to formulate the fundamental assumptions and main principles that underlie normal and abnormal psychology. Every science,

ERRATA

P. ii, line 9, for *left* read *felt.*

P. v, line 9, insert *studies* after *experimental.*

P. 154, line 24, for *epileptoform* read *epileptiform.*

P. 232, line 9, insert *I* before *who thinks.*

P. 253, line 12,
formula should read $(a+b+c+d+\ldots\ldots)^n$

P. 300, line 4, for 3 read 4 and for $(1+r)^3$ read $(1+r)^4$.

P. 310, line 11, for *from* read *form.*

P. 375, line 16, between *the* and *my* insert *experience of.*

P. 338, line 5, A_8a, read A_8a^8.

P. 394, line 19, for *election* read *electron.*

P. 397, line 10, for *effective* read *affective.*

chemistry. Mach, Poincaré, Ostwald, Pearson others have contributed to this spirit of investigation the domain of physical sciences. This spirit of inquiry has become of late specially intensified by the revolutionary discoveries of radio-active bodies.

We are acquainted with the great movement which has swept all over biological, sociological, and economical sciences due to the influence of the theory of

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PREFACE

In this volume I made an attempt to formulate the fundamental assumptions and main principles that underlie normal and abnormal psychology. Every science, mathematical, physical or biological, has its postulates as the foundation of its structure. Psychology as a science has also its own assumptions which have to be clearly formulated. The object of the first part of this volume is the unravelling of the principal concepts and hypotheses which form the basis of the study of mental phenomena.

All through the domain of the sciences there is a vast movement for the search of fundamental concepts and for the close investigation of such concepts. Even such an exact science as mathematics has felt this spirit of examination of its fundamental assumptions, axioms, and postulates. Men like Lobatchevsky, Bolyai, Rieman and others have given the start and a number of mathematicians have recently followed in their footsteps, with the result of getting a wider horizon and of opening unknown regions. The same we find in the case of physical sciences, such as physics, mechanics and chemistry. Mach, Poincaré, Ostwald, Pearson and others have contributed to this spirit of investigation in the domain of physical sciences. This spirit of inquiry has become of late specially intensified by the revolutionary discoveries of radio-active bodies.

We are acquainted with the great movement which has swept all over biological, sociological, and economical sciences due to the influence of the theory of evolution. The spirit of free inquiry into fundamental concepts has seized on all sciences. Throughout the whole domain of human thought there is felt this rejuvenating and invigorating breath of the new revolutionary spirit. Philosophy, ethics, aesthetics, history, law, economics all have been awakened out of their long sleep of centuries. Every science has been shaken by this mighty movement to its very foundation. Even such a dry study as logic has left the vital breeze of the inquiring spirit of modern times.

I make an attempt in this volume to examine in an elementary way the foundations of normal and abnormal psychology. This is all the more necessary as physiologists, biologists, biological chemists, and recently students of comparative psychology, a science which lies on the borderland of psychology and biology, have a tendency to make incursions into psychology proper, and favor mechanical or purely physiological concepts to the detriment and even total exclusion of mental processes.

This tendency towards elimination of psychic life by mechanical processes or by "The Unconscious" is also observed in the writings of some workers in the domain of psychopathology. They think it is in the interest of strict science to express wherever possible mental states in terms of physical changes. Finally a stage is reached in which all consciousness is completely dispensed with in favor of physiological processes or "The Unconscious". Psychology is thus made a branch of physiology and biology.

Again, philosophers and metaphysicians are apt to make intrusions into the domain of psychology, because the latter is regarded by them from time immemorial as legitimate prey, inasmuch as their own domain lies on the outskirts of mental life. In the interest of metaphysical systems philosophers attempt to subject psychology to their own speculative purposes.

The popular mind has a tendency of regarding psychology as something mystical and of identifying psychology with all kinds of faith cures, mind cures, spiritism, telepathy, telaesthesia, and table rapping. It is unfortunate that even medical men of note, on account of lack of acquaintance with psychological subjects and inquiries, are apt to look askance at psychology and identify it with religious beliefs, mental cures as well as with the more shady side of spiritistic manifestations.

Still more complicated is the plight in which the psychologist finds himself in regard to the recent claims put forth by some psychologists in having achieved results of importance to law, industry, and to the reformation of social ills. The demand for practical results in psychology is due to the industrial spirit of our times, a spirit which requires immediate results that can be cashed or expressed in dollars and cents. The earnest psychologist should repudiate such industrial business psychology, for the simple reason that such a psychology is imaginary; in other words, such a psychology does not exist. An experienced salesman, an intelligent business man knows infinitely more about business and how to obtain the best results out of certain combinations than all the psychologists with their laboratory experiments, their artificial statistics, and puerile trivial experimental arrangements, giving results no less trivial and meaningless.

The claims made by psychologists as to industrial efficiency which psychology can give is ludicrous in the extreme. We may as well expect the astronomer to claim that astronomy can give points how to conduct successfully a political campaign. As a matter of fact the psychologist has nothing to say on the subject of advertisements, industry, and business, but commonplace trivialities expressed with all the pomposity of scholastic authority. Industrial efficiency does not belong to the domain of psychology. We may as well expect the comparative psychologist to offer practical points on the efficiency of cows to give milk or on the efficiency of hens to lay eggs. The success of advertisement is a matter of experienced business men and not of academic psychologists who have to offer nothing but the merest platitudes.

We must once for all enter a protest against those psychologists who claim that they have some great psychological truths to reveal to business men, manufacturer and workingmen. I trust that both the businessman and the workingman will have enough common sense to take such psychological truths for what they are actually worth. The ordinary psychologist understands little of business life, knows almost nothing of the life of the laborer, and is woefully ignorant of the economical questions of the times. Psychological business claims are illusory. The sooner the practical business man learns this fact the better for him, and also for the earnest psychological investigator.

Psychology is just emerging from its metaphysical and theological stages as Auguste Comte would put it. Psychology is just entering the circle of her sister sciences. At present it is in a state similar to the physics of the sixteenth century. The psychologist should declare frankly and openly that he can no more assist the businessman and the manufacturer than the mathematician with his non-Euclidean geometry or the logician with his algebra of logic can help the solution of the great problems of capital and labor.

We can obtain some help from abnormal psychology in its application to the medical treatment of nervous and mental maladies. This is quite natural as abnormal psychology is essentially based on clinical and experimental of mental diseases. The claim, however, that psychology can give directions for vocations of life or for business and industry is entirely unfounded.

The same holds true of the practical pseudo-psychology that has invaded the school, the court, the prison and the immigration bureau. The intelligence tests are silly, pedantic, absurd, and grossly misleading.

I have not discussed in this volume the practical aspect of recent quasi-business psychology for the reason that such claims are nothing but a snare and delusion. Of course I do not expect that this warning of mine as to the misleading character of applied psychology will be taken graciously. There is at present an epidemic of practical or applied psychology. People however will wake up from their psychological dreams and will realize that applied psychology is nothing but a nightmare. I am fully aware of the fact that my present protest will draw on me the ire and severe attacks of many a psychologist, but I sincerely hope that some of the more earnest psychologists will sustain me in my present contention.

So much for the practical limitations of psychology. In discussing the theoretical aspects of psychology and attempting to point out its limitations I have had to touch on problems ultra-psychological, but this was unavoidable. It had to be done in order to clear the path and see the lay of the land. I have no doubt that there will be found a great number of shortcomings in the foundations as well as vagueness in the delineation of the main postulates and psychological principles. I shall be fully satisfied, if this volume will stimulate others to better work in the same direction.

The second part of this work deals with my theory of "moment-consciousness." This theory was advanced by me some sixteen years ago in my "Psychology of Suggestion." It was further touched upon in my "Multiple Personality," but I had not stated the theory as distinctly as I did in this volume. I may add that when James read the theory in "The Psychology of Suggestion" he told me he found it valuable, and urged me to develop it more in detail.

The theory of moment-consciousness presents a general view of the nature and development of consciousness, from reflex consciousness to compound reflex and instinctive consciousness reaching the highest form of consciousness, that of self-consciousness. Consciousness and the adaptation of the psychic individuality or of the organism to the external environment is looked at not only from a psychological, but also from a biological standpoint. Consciousness in the course of its development is presented in a series of stages and types, each lower stage leading to the next higher and more complicated stage and type. This does not mean that the higher type is included in the lower We must assume spontaneous mental variations, or psychic mutations, so that while the stages and types are arranged in a progressive series of their development and complication, they at the same time differ *qualita-*

tively in type of mental life.

I may add that most of the ideas developed in this volume have been formulated by me some fourteen years ago, and then retouched from time to time. A few of the chapters with some modifications have been published by me in various psychological and medical journals.

BORIS SIDIS.

Sidis Psychotherapeutic Institute,
Portsmouth,
New Hampshire,
January, 1914.

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PART I

FUNDAMENTAL CONCEPTS AND PRINCIPLES

The Foundations of Normal and Abnormal Psychology

CHAPTER I

PSYCHOLOGY AS A SCIENCE

WE assume that the reader regards psychology as a science. It is however one thing to label a subject as a science and another thing to understand clearly in what sense the term science is used in the case of psychology. A clear understanding of the nature of science is here of special importance on account of the peculiar position psychology occupies in the hierarchy of human knowledge. It is therefore desirable to define the meaning of science before we proceed to discuss the subject matter of psychology.

Science is the description of phenomena and the formulation of their relations. Science describes facts and formulates their relations in laws. The task of science is first to formulate facts belonging to the same type, and then to generalize them, that is to express their general relationship by one comprehensive formula, in spite of the many individual variations in the phenomena. Thus in geometry, possibly the most ancient of all sciences, many isolated and important facts were already known to the semi-civilized nations of antiquity, but it required the rationalizing spirit of the

Greek mind to classify and generalize the facts into theorems, the laws of space. Many important properties of the right-angled triangle, for instance, were already known to the ancient Chaldeans and Egyptians. They knew that if in a right-angled triangle the two sides are respectively three and four, the hypothenuse must be five and so on; that is, they knew only concrete facts, but what they lacked was just the scientific side. It required a Pythagoras to discover that in all right-angled triangles the sum of the squares of the two sides is equal to the square of the third. No matter what the size of the triangle be, no matter how different in length its sides are, once the triangle be of the same type, namely right-angular, the same general relationship must obtain.

To take an illustration from physics. Falling bodies form one type of movement. Now the bodies themselves may be different in kind, in nature, may be of various material, may differ widely in structure, weight, and shape, and still, since they all belong to the same type of motion, they are, in spite of their manifold diversity, expressed in one general formula, in one law, namely, that the spaces traversed are proportional to the square of times.

In other less exact sciences the facts are exhaustively described and a general statement is formulated as to their relationship. In physiology, for instance, we find mainly descriptions of facts classified into types, the relationships of which are expressed in general formulae, or laws. Thus in the cerebro-spinal nervous system, each part and its functions are described as fully as possible, and then all the facts are brought under one comprehensive formula such as the reflex arc. In embryology the different changes of the embryo are minutely described, classified into types, into a certain number of definite stages, and then all the changes, in the infinite wealth of their variety, are expressed in the general proposition that the embryo in the short period of its development traverses in an abbreviated form all the stages that the species has passed through in the many ages of its existence; all the changes are generalized in the formula that the ontogenetic series is an epitome of phylogenetic evolution. We may, therefore, say that science is a description of types of facts, the relationships of which are expressed in general comprehensive formulae, or laws. It is in this sense that we understand psychology to be a science; it classifies phenomena into types and searches for the general expression of their relations, or for what is termed psychological laws.

We must come to something more precise and definite. We said that psychology deals with classification and generalizations of phenomena; but what are these phenomena? In the different branches of science, we find that each one has a determinate order of phenomena to deal with, a definite subject matter. Thus geometry deals with spatial facts, mechanics with motion, physics with changes of molecular aggregations, chemistry with atomic combinations and their mutations, physiology with processes going to make the equilibrium of organic life, sociology with phenomena of social life, and so it is in the case of all other sciences. Now what is the subject matter of psychology? What are the facts, the phenomena with which psychology deals?—*Psychology deals with facts of consciousness.*

On the very threshold of our discussion, we may be stopped by the pertinent question: "You say that psychology deals with facts of consciousness, but what is consciousness?"—Consciousness is subjective facts, such as the elements of sensation, feelings, pains, thoughts, acts of willing and the like. Positive science must have given facts, data to work upon; these data it analyzes, describes, classifies into types and seeks to find the formulae of their relationships. Psychology can accomplish no more than any other science. The data of psychology are facts of consciousness, these facts are analyzed into their simplest elements, and the laws of their relations are searched for. But psychology does not, and legitimately cannot possibly go beyond consciousness. Consciousness is the ultimate datum which psychology must assume as given and which is from a psychological standpoint unanalyzable. Consciousness must be postulated, if we wish to enter the temple of psychology.

In this relation psychology is as positive as the rest of her sister sciences. Geometry, a science to which no one will deny exactness, deals as we know with the laws of space-relations. Should we ask the geometrician the same question just put to the psychologist: You say that your science, geometry, deals with facts of space and their relations, but what is space? The geometrician will smile at us. He will tell us that by space he means such forms as lines, angles, triangles, quadrilaterals, circles, cubes, cylinders, pyramids, etc. Should we persist and ask further, "Yes, that is true, but all these are so many forms of space, what is the space itself with which you deal?" The geometrician will no doubt answer: "My dear sir, geometry deals with *facts of space*, space itself is taken as an ultimate datum. The work of geometry is not to ask what space is in itself, but what the relations are of spatial *forms*, space itself being postulated."

Mechanics deals with the laws of energy and motion, physics with molecular changes of matter, but neither physics nor mechanics would have gone far, had they stopped to answer the questions as to what motion, energy, matter are in themselves. These are simply postulated, taken for granted, they are the ultimate data of these sciences. In this respect psychology does not differ from other sciences, it takes its subject matter as given and does not inquire as to what the nature of the material is in itself. The reader must remember that the question as to what things are in themselves is not at all a question of positive sciences, but of metaphysics. I do not mean in any way to detract from the dignity of metaphysics, what I wish is simply to point out the limits of positive science. The problem as to what things are in themselves does not fall within the province of science, but within the domain of metaphysical research.

The question as to the nature of consciousness, what it is in itself, may be a very important one, but it lies outside the ken of psychology, just as the laws of aesthetics do not concern the chemist, although the latter may be a great lover of beauty. In the contemplation and enjoyment of a beautiful picture he will not introduce a chemical formula, and in his chemical experiments he will not introduce aesthetic considerations. The same holds true in the case of psychology. The psychologist may be a metaphysician, but in his psychological work he must keep clear of metaphysics. *Consciousness therefore is a presupposition, a postulate of psy-*

chology.

There is one more important assumption which psychology must start with in order to be a positive science at all, namely, *uniformity. Under similar conditions like results follow.* Suppose a geometrician should prove to you that the sum of the three angles of a triangle is equal to two right angles, suppose that some sceptic should come in and say, "Yes, that is all right in relation to the triangles in this particular space, in another portion of space, on some other star, or planet the theorem will not hold good." The only answer the geometrician could give is that we must assume that space is uniform, so that wherever we form our triangles we obtain the same results. The same is true in mechanics. The laws of motion and inertia hold good of the pebble on the roadside, of the dust grains dancing in the sunbeam, and of distant stars in the milky way. Uniformity of relations among phenomena must be postulated, if science is to be at all. If under the same conditions different results follow, science would have been an impossibility. Uniformity of nature is one of the most fundamental postulates of science. Psychology assumes uniformity; it assumes that there exist *constant uniform types of mental activity with definite relations that can be formulated into psychological laws.* Thus psychology at the very outset postulates consciousness and uniformity of mental phenomena.

We can now see in what relation psychology which deals with phenomena of consciousness differs from philosophy whose subject matter is also consciousness. Philosophy has no postulates, psychology, like all other sciences, must have its postulates which it cannot transcend. Philosophy deals with the ultimate in consciousness, it investigates the very postulates of conscious activity. Psychology on the contrary accepts the facts of consciousness as ultimate data.

CHAPTER II

PHYSICAL AND PSYCHIC FACTS

PSYCHOLOGY we said deals with facts of consciousness, but this is too broad a statement, for there are other sciences that also deal with facts of consciousness, such as ethics, aesthetics, logic. In what respect does psychology differ from these sciences? It differs in this that ethics, aesthetics and logic are normative regulative sciences; psychology is a positive natural science. Ethics deals with ideals of moral life, aesthetics with ideals of beauty, and logic with ideal ways of correct reasoning. All these sciences deal with ideals, with norms to which the matter of fact consciousness *ought* to conform, if it is to act *rightly*. They put a value on the phenomena. Psychology, however, like all other natural sciences has no other ideal than fact, it admits of no "ought." From a strictly psychological standpoint, the ugly and the beautiful, the good and the evil, the true and the false are of equal value. Psychologically they are all facts of consciousness and must be studied as such; just as the serpent and the dove are of equal interest and value to the naturalist. The ravings of a maniac are of the same psychological interest and value as the subtle reasoning of a Newton. Psychology is a positive natural science, it does not deal with the subjective evaluation of facts of consciousness, but with their *objective natural existence.*

Having shown in what psychology agrees with other positive natural sciences, we must now point out in what it differs from them. Psychology deals with phenomena of consciousness as facts of objective natural existence. Are these facts of the same order with those of the physical world, the subject matter of the natural physical sciences? We must answer *in the negative.* The objects of the natural sciences of the physical world are of a material and spatial nature. A physical body has weight, occupies a certain portion of space, so has the molecule, the atom. Can we say the same of psychological facts? By no means. They are different in kind, and this I wish especially to impress on the mind of the reader. To realize this truth, I think it a good preliminary psychological exercise for the reader to try to find how many grams, or grains his idea of beauty weighs, how many millimeters long, wide and high his feelings of love are; let him indulge in the fancy of conceiving an engineer building a bridge with mathematical formulae as links, and his feelings of virtue and patriotism as supports. On the other hand let him think of a logician trying to fill up the defects of his train of reasoning with solid bricks, and using as connecting links bars of pig iron. In short, psychology differs from physical sciences in this, that its facts, *the facts of consciousness are not of a material nature.*

"Do not physical sciences" it may be asked "deal with such phenomena as sound and light?" Certainly they do, but these sciences regard these phenomena from a standpoint radically different from that of psychology. Sound in physics is not the sensation sound, but the external, material vibration of air, which may or may not give rise to a sensation of hearing. The same holds true in the case of light. What physics investigates is not light as sensation, but vibrations of ether which may or may not give rise to a sensation of sight. *It is, however, just such facts as sensations, facts not spatial in their nature which constitute the subject matter of psychology.*

"May not facts of consciousness be some kind of matter, some form of material substance the constitution of which we do not as yet know?" Such was the question put by a medical man, when he heard me expounding the difference in kind between physical and psychical facts. "That *might* be" I answered, "but then that substance, *if* it ever be discovered, will not have the properties of matter; it will be a "matter" totally different in kind from that studied by the physicist. For the "matter" of physical sciences is essentially one of *extension;* a matter however that occupies no space is an existence altogether different in kind from that of extended things, and is certainly no "matter" for the physicist.

The persistent antagonist may raise here a further objection. "Are not the phenomena of consciousness" he may ask "facts of activity? And is not activity, kinetic energy? And if this be the case must not the facts of consciousness be ranged along with physical phenomena, be reduced to the manifestations and transformations of kinetic energy and thus really and ultimately fall within the domain of the mechanical sciences?"

Change certainly is manifested in the mutations of states of consciousness, but this change is not the physical change of translocation. Change in the states of consciousness may no doubt, be regarded as activity, and if you please as energy, but this activity is not the energy of mechanics. Activity in mechanical or physical sciences means molar, molecular, or atomic movement of matter through space, while psychic activity is not a translation of matter through space, a thought is not a material mass having extension, weight and locomotion. This truth, simple as it may appear, cannot be too often repeated and too strongly emphasized, since one frequently meets with this fallacy of "thought-materialization" in the world of psychiatry. Words are often misleading and the metaphorical expression "mental energy" is taken in its literal meaning of mechanical energy. While I am writing these lines I find in one of the number of the Russian "Archives of Psychiatry and Neurology" edited by Prof. Kowalevsky, an article, in which an attempt is made to express mental activity in terms of mechanical energy. The writer might as well attempt to change inches into pounds. He who undertakes the examination and study of mental phenomena must bear in mind the simple and important, but frequently forgotten truth, that facts of consciousness are not of a physical, mechanical character.

Against our view may be urged the fact that in proportion as a science tends to become exact, it takes on more a quantitative aspect, its phenomena are reduced to molecular or atomic changes. If now psychology is a science at all, it will reach its exactness, when it can be expressed in terms of matter and motion, so that the phenomena presented by consciousness, although at present impenetrable to our imperfect instruments and methods of investigation, must ultimately be reduced, in some way or other, to mechanical terms. Psychology has not yet had its Galileo.

This objection may be easily disposed of by the simple answer that the exactness of science is not at all in proportion to its degree of reduction to terms of matter and motion. No one will deny that mathematics is an exact science, but is it exact because it is reduced to mechanical terms? While mechanics must be logical, logic is not mechanical.

Within certain limits this generalization of the relation of scientific exactness to mechanical formulae may be fully granted, if it be restricted to the concrete physical sciences, but it cannot possibly hold good in case of psychology, as the latter does not fall within the circle of the physical sciences.

The weakness of this last objection from scientific exactness becomes clearly disclosed, if we get a little deeper into the matter. The reason why there is such a persistent tendency to reduce science to mechanical terms is based on the tacit understanding that atoms and motion are the only ultimate realities. We see at a glance that this consideration is at bottom purely metaphysical; it is a consideration which science has not to take into account. Nothing is so dogmatically metaphysical as just the common sense that has an abhorrence of metaphysics. That atoms and their motions are the only ultimate realities is certainly metaphysics and bad metaphysics too, as it is unguarded by reflective critical thought. Since this unreflective metaphysics of atomism is widely spread in the medical world, and is considered scientific, one cannot help discussing it, pointing out its deficiencies, showing up the obstacles it puts in the way of positive science. Metaphysics is a branch of philosophy which deals with the nature of reality. As philosophy it accepts no unanalyzed concepts; unlike science it has no postulates taken blindly on faith. The proposition now before us, namely that atoms and their motion are ultimate realities, is bad metaphysics, because it is a blind unanalyzed postulate. How do we know that atoms and their motions are ultimate realities? Why not ask what is reality? Once we are on metaphysical ground, why not take it in real earnest? Why stop on atoms and motions? Atoms themselves are not ultimate simple units, they have shape, size, weight. Now shape, size, weight, what are they after all? They are so many resultants of masses of tactual, visual and muscular sensations, which are as little ultimate as are the sensations of color or of pain. It is out of sensations, percepts and ideas that the concept "atom" is framed. Subtract from the atom its sensational, perceptual and ideational elements, abstract from it its shape, size, weight and the ultimate reality of the atoms will become a bare nothing. The atom therefore is ultimately resolved into terms of *consciousness.* The same holds true in case of motion. Motion is a mental product of what is known as muscular and retinal sensations. What is most ultimately known is only consciousness and its facts. The atom and its motions are after all nothing else but constructs of consciousness. From the standpoint of epistemology, or what the Germans call "Erkenntnisstheorie," we have only a double series of mental phenomena, one standing for the internal and the other for the external world, and not atoms, but mental life may be regarded as the ultimate reality.

From a strictly scientific standpoint, however, we have no right to resolve matter into mind or still less mind into matter, because the two are presented to consciousness as different in kind, even though they both may belong to a general consciousness. Between the two series of facts, the physical and the psychical, there exists a fundamental difference. The door yonder is covered with white paint, the inkstand before me is made of glass, is round, is heavy, is black, but my idea of the door is not covered with white paint, my idea of the inkstand is neither made of glass, nor round, nor heavy, nor black. In short, *the facts of consciousness are not spatial.*

A fallacy prevalent among the medical profession and now also extant among the populace is the placing of psychic life in the brain. The neurologist, the pathologist ridicule the old Greek belief that the place of the mind is in the heart. Modern science has discoverd that the heart is nothing but a hollow muscle, a blood pump at best, the place of mental processes is in the brain. This medical belief now circulating in the popular and semi-scientific literature of to-day differs but little from the ancient Greek belief, it is just as fallacious and superstitious. It is true that psychic life is a concomitant variable function of nervous processes and brain activity, but neurosis is not the cause of psychosis. The brain does not secrete thought as the liver secrets bile. The mind is not in the brain, nor in fact is the mind anywhere in the universe of space; for psychosis is not at all a physical spatial process.

As fallacious and superstitious is the recent tendency of medical investigation to localize psychic processes, to place different psychic processes in different seats or localities of the brain, thus implying that each psychic process respectively is placed inside some cerebral centre or nerve cells. Psychic life is no doubt the concomitant of nervous brain activity, and certain psychic processes may depend on definite local brain processes, but the *given* psychic process is not situated in a definite brain centre, nor for that matter is it situated anywhere in space.

CHAPTER III

THE DEFINITION OF THE PSYCHIC PROCESS

THE definition thus far given of psychic life is rather of a negative character. We defined the psychic phenomenon in opposition to the physical phenomenon. Physical phenomena are in space, psychic phenomena are not spatial. Now a negative definition may to many prove rather unsatisfactory. It is, therefore, desirable to define psychic phenomena in more positive terms.

It is now the tendency to define the physical process in social terms and the psychic process in terms of individual cognition. A physical phenomenon is defined as one common to many minds, while a psychic phenomenon is an object of an individual consciousness. I think that such a view of the external physical object, as that which is common to many minds in contrast to the psychic or that belonging to an individual mind only is incorrect from a purely psychological standpoint. Psychologically considered the characteristic trait of a physical object is not that it is *common*, but that it is *external*. The tree yonder is to me a physical object, not because it is common to many minds, but because I *perceive* it as external, the sensory elements of the perception carry with them external objectivity.

The social perception of an object may be one of the criteria of external reality, but certainly not the only one, and surely not the chief one. In perceiving an object I do not consider it as a physical object, because I know that it is common to my fellow-beings, but because the very psychic process of perception gives the immediate knowledge of externality. An object is considered as physical, not because of its social aspect, but because of its perceived external aspect. Had my perception of the house yonder been a hallucination, I would have still seen it as external and therefore regarded as a physical object; and should this hallucination furthermore be confirmed by the testimony of all my other senses, should I be able to touch it, press against it and feel resistance, knock myself on it and feel concussion and pain, and have a series of tactual and muscular sensations by walking into it and around it, and should I further have this hallucination of all the senses every time I come to this identical spot, the object would be to me an external physical object, and no amount of social contradiction could and would make it different. Regarded from a psychical standpoint an object is considered as physical, not because it is common to other minds, but because it is projected as *extensive* and *external* to mind. *Not community, but extension, externality* is the psychological criterion of the physical object.

It is true that community of object is one of the criteria of external reality, but it is certainly not true that the community of the object gives rise to the perception of externality. It may, on the contrary, be claimed, and possibly with far better reason, that it is the object's externality that gives rise to its community.

The child in its growth learns to discriminate between things and persons. Persons move, act, make adaptations, while things are moved, acted upon, adapted to; persons initiate movements, things do not; persons are prime movers and it is to them that one has to look up in the satisfaction of needs and in the acquisition and use of things. As against persons things are contrasted as impersonal. Gradually the child learns to include himself within the class of persons,—his hopes, wishes and desires come in contact, as well as in conflict with those of other persons, and he learns more and more of inner life and activity with which he finally identifies all personality. Personality is more and more stripped of the thing aspect until the inner mental life, especially in its will aspect, remains as its sole characteristic. Persons are *willers,* and it is these wills which are of the utmost importance for the child to learn as the fulfillment of his will depends on them. He then learns to class himself within the category of willers; he himself is a willer. Impersonal things, falling outside and being contrasted with the class of willers, are conceived as independent of persons.

Moreover, while from the very nature of the case each willer bears to things a direct relation, his relation to other willers is only to be established through things. Wills come in contact not through the mere fact of willing, but through their relations to things. Coming in direct relation with things, things alone give direct experience, experience in its first intention. In other words, only things give rise to sensation or rather perception; hence sensory life with its time and space experience giving rise to externality is the criterion of the universe of things, conceived as independent of will. Only *thing* is external, *will* is not. Wills, however, can come in relation through things, and only through the same things; the universe of things must be a common one to all the wills, if these wills are to come into relation at all. In other words, *the physical universe, genetically regarded,*

is external not because it is common, but it is common, because it is external.

The definition of the physical object as that which is common to many minds and of the psychic object as that which is present to one mind only is not acceptable, since it postulates the result of complicated epistemological reflection and psychological research, still very doubtful in themselves, at the very outset of the science of psychology. It may be that the world is nothing but consciousness and that the physical universe is nothing but the social object of many minds; still all this belongs to the domain of epistemology and metaphysics. The psychologist deals with phenomena and not with the "really existent." Standing on the ground of psychology the psychologist has no right to reduce the physical world to psychic terms; in fact, such a procedure would undermine his science, as all distinction between psychic and physical facts would become obliterated. For if by an "object" common to many minds we mean an object external to those minds, then we gain nothing at all by introducing the "many," it is just this "external" that has to be defined; if by the "common object" we mean an object psychic in its character, but only of a social nature, then we reduce the physical universe to consciousness and thus identify physical and psychic processes. Such identification is an obliteration of the opposition between the psychic and physical facts, an opposition with which the psychologist must set out, if he is to place psychology in the hierarchy of natural sciences. The psychologist must postulate the existence of an external physical world, just as the geometrician postulates space or the mechanician matter and motion.

It is the task of the epistemologist and metaphysician to inquire into the nature of that physical world whether it really exists independent of consciousness. Without, therefore, going into metaphysical considerations, I think it is best to define the physical phenomenon as *the object or process conceived as being independent of consciousness,* while the psychic object or process is *one that is conceived as being directly dependent on consciousness.* It seems to me that this definition has the merits of being positive as the one given by the representatives of the idealistic school; it has not the defects of bringing in irrelevant metaphysical and epistemological considerations; and it has furthermore the advantage of being fully in accord with the data and postulates of psychology.

CHAPTER IV

PSYCHIC STATES AS OBJECTS

THE attacks may now be renewed from quite a different direction. We asserted that psychology deals with facts of objective, natural existence, the subject matter of science in general. How does it rhyme, it may be asked, with the conclusion just arrived at, namely, that the facts of psychology are different from those with which other natural sciences deal? To this may be answered that facts may agree in being objective, and still differ widely as to kind,—a square and a man, a pound and a mile, are all objective, and still their difference is certainly a fundamental one.

An objection may be raised that may to some appear as a very grave one. Is psychology a science at all? Does it actually deal with objective natural existence? Physics, chemistry and other concrete sciences treat of objects, of facts, in the external world. Any one can go and verify those phenomena and their relations. This, however, is not the case with facts of consciousness, they are essentially *subjective*. Psychology, therefore, properly speaking, is not a science in the same sense as other sciences are. This objection may be easily obviated by the very simple consideration that the facts of any individual consciousness are as much objective to other people, as the chair, the table, the molecule, the atom. My individual consciousness is considered by others as external, as objective, as existing outside of their consciousness, and, in fact, were it not so, there would have been no individuality.

After this lengthy discussion we at last arrive at the conclusion, that although the facts which psychology treats of are not of a material, physical nature, they are none the less *objective* in character. Objective however, as the facts are, they are not independent of consciousness in the same way as the objects of the external world are regarded, they are essentially facts *of consciousness*.

"What is the relation," it may be asked, "of psychology to the physical and biological sciences?" The physical and biological sciences constitute a system of knowledge of the material world. Psychology investigates the genesis of this knowledge. Mechanics, for example, treats of motion and space. Psychology investigates not what motion and space are in themselves, but what the elementary acts of consciousness are out of which the space and time perceptions are developed.

The different objects which other sciences treat of may be regarded psychologically, and studied from the standpoint of their rise and development in consciousness. For objects to be known at all must first be perceived or conceived by consciousness. Psychology implies knowledge of the physical world as the content of consciousness. In order to know how perception and conception of objects originate, those objects must first of all be given. A thing that is not yet in existence cannot possibly be analyzed. It is only when knowledge of objects is already formed that one can begin to think about knowledge itself, how it originated and how it came to be in the shape possessed by the knowing mind. Physical sciences are in that relation independent of psychology, the former can be carried on to a high degree of perfection without any knowledge of psychology, while psychology without knowledge of the physical world would simply lack subject matter.

Apart, however, from the fact that psychology has as its subject matter the objects of physical sciences as perceived by and developed in consciousness, it also studies the forms, the character, the way of working of consciousness, it formulates the laws of how consciousness works, and analyzes into simplest elements and their combinations, the rich material that goes to make up the mental life of individual existence, or what is known as mind.

The postulated objective reality acts upon the given individual consciousness and gives rise to mental states which along with the objective representation of that reality has also its own coloring, its own subjective side. The represented object floats so to say in a stream of consciousness. The subject matter which the psychologist investigates is not the objective reality itself, but *objective states of consciousness.*

We may represent the relation of the psychologist to his object of study by the following series:

1 The objective reality.
2 The represented object.
3 The subjective stream.
4 The objective state of consciousness.
5 The psychologist.

We must be on our guard and not confuse objective thought, the thought of the object, and the object of thought. The three differ fundamentally, and the standpoints from which the matter is regarded must be constantly kept in view. The thought contemplates and holds the object by the function of knowledge it possesses, but the knowledge constituting the thought and the object of that thought are totally different in their nature. The object in the external world may undergo change, but the thought that got hold of the object may still persist, or on the other hand, the thought may change and the object still remain the same; or again the thoughts and the object may both change. As I am writing these lines a red book lying on my table strongly attracts my attention, and for the time being constitutes the object of my thought. I can close my eyes and continue to represent to myself the red book, its color, its size, its content, in short all about the red book, the red book constituting so to say the "focal-object" of my thought constantly renewing itself by the fresh material which it draws from the surrounding marginal stream. Meanwhile the book may be changed, the cover may be torn, the pages may be mutilated, the book may be burnt or substituted by another body or by a totally different object, say an ink-stand; or on the other hand, the book may remain lying on my desk undisturbed, but my thought may change. I may begin to think of something else, say of the coming election or the Spanish war; or both the book and thoughts may change, the book may be taken away and I at the same time may think of something else, say of the watch and its mechanism. The cognizant thought that possesses the object and the object of that thought are from a purely scientific psychological standpoint, independent variables.

Thought itself with its object may in its turn become an object of thought, and here once more the same relations obtain. The contemplations or psychological analysis of a thought must be discriminated from the thought as the material or object of that analysis. From the confusion of these different aspects many a fallacy results. Thus the schematic incessant change in the flow of objective time is confused with the state of consciousness having time as its object, and the attributes of one are fallaciously ascribed as undergoing continuous change. Another fallacy often committed by the so-called "new psychology" is the substitution of the attributes of the object for those of the functioning thought.

CHAPTER V

THE SCOPE OF PSYCHOLOGY

PSYCHOLOGY, we said, deals with states of consciousness, but these states are not independent, floating in the air so to say. They are in connection with some material existence, and not with physical reality as a whole, but with some definite individual body. We must keep in mind that psychology is first of all a natural science, and the only thing it has to take into consideration is *experience.* Now as a matter of fact we never find a thought, an idea, a sensation setting up on its own hook and having complete independence of all physical reality. Were even such a thing possible, we could not know of it, because the only way we come to know of other thoughts is through their physical activities perceived by our sense organs. We know of the existence of other individual hate, love, anger, friendship, kindness by the physical expressions of those feelings, by the acts that accompany them. We know of the thoughts, of the emotions, of our companions, by the muscular expressions of the face, by the changes in the brilliancy of the eye, by the general bodily state, such as quietness or restlessness, by their gestures, by many other physical expressions, but principally by means of those physical manifestations known as speech. Were all those concomitant physical processes absent, there would have been no means whatever of knowing of the very existence of external states of consciousness. As an empirical science psychology studies only such states of consciousness as are connected with physical reality, or truer to say with some individualized physical being. In short, psychology treats of states of consciousness as dependent on or connected with the corporeal individual.

The meaning of the concept "corporeal individual" must not be left in a vague state. From a purely mechanical standpoint we may say, that a corporeal individual is a closely interrelated system of material parts forming a more or less stable equilibrium. This equilibrium is constantly being interfered with, by the forces of the external environment, but as long as that equilibrium maintains itself in resisting the disaggregating influences of external forces, it may practically be considered as a corporeal individual. In other words, a corporeal individual is a system of material parts organically interconnected, and functioning as one determinate whole. Any living being will answer our definition. From the lowest stage to the highest; from the monocellular amoeba to the highest, most complicated multicellular organism, we meet with the same fundamental traits, characteristic of what we term the "corporeal individual." Now it is the mental states of the corporeal individual that psychology investigates and studies.

In our last discussion we have come to the conclusion that consciousness depends on the corporeal individual and can only be known from physical, bodily manifestations. Each living being manifests some activity in its reactions to the stimuli of the external environment. Now what are the reactions characteristic of consciousness? Where are the distinctive marks that stamp a physical manifestation with the impress of psychic states? The only sure way to tell is by purposive activity. We know that our neighbor is conscious, because of his active purposive life. When a fly is on his nose, he raises his hand and brushes it away; he knows how to walk and preserve equilibrium; avoids obstacles; lives in a house for protection from the changes of weather and from harmful intruders; seeks shelter from rain; dresses himself warmly on a frosty winter day; a thousand other movements all of them expressive of purposive activity tell us of our neighbor's consciousness, intelligence. The stone on the road changes its place according to the influences of incident forces; the grain of dust is blown hither and thither by the wind; they do not show a more or less definite purposive activity under changing circumstances. The disturbance of their equilibrium does not stimulate them to induce changes in the external environment, changes that would tend to restore that lost equilibrium. They, therefore, have no purpose. For a purpose is the tendency to realize some external action which is useful or indispensable to the life-existence of the particular individual being. The tendency to the maintenance of a definite activity in opposition to the onset of disturbing forces of the environment in order to restore the lost equilibrium, may be considered as the universal formula for purposive life in general.

This formula holds true of all animal life. The man in running after the car has purpose, so has the cat in chasing the mouse, so has the deer in fleeing from the hunter. The very amoeba, that lump of protoplasm, in extending its pseudopodia to draw in the bit of nutriment, possesses the germ of purposive activity, and some primitive psychic state must therefore be ascribed to it. *Life is essentially purposive in its na-*

ture. Wherever, therefore, we meet with life, there some form of psychic state, however primitive and elementary, must be present. Psychic states stand in the most intimate relationship to life activity. The two in fact cannot be separated. *Psychosis is concomitant with biosis.* Psychologists as well as physiologists all agree thus far, that there is no psychosis without neurosis; some go further and affirm that there is no neurosis without psychosis; I think, we are closer to the truth, if we advance still further and assume, that there is no *biosis without psychosis.* Psychic states must be predicated not only of highly organized animals, possessed of a nervous system, but also of the most elementary monocellular organisms.

The evolutionist especially must accept our last conclusion, for he will agree that consciousness did not come into existence *per saltum,* he will acknowledge that the germs of conscious life characteristic of the highest organized being must already be present in the lowest types of life, out of which developed the higher, the more complex organisms.

We are now in a position to define the scope of psychology.

Psychology is the science of psychic states both as to content and form, regarded from an objective standpoint, and brought in relation to the living corporeal individual.

CHAPTER VI

THE SOURCES OF PSYCHOLOGY

FACTS of consciousness, we pointed out, are the subject matter of psychology. The question arises as to the sources of the facts. The botanist, when he wishes to carry out a series of experiments, goes into the herbarium or into the field to gather the material for his study. The entomologist collects his specimens on the street, field, and forest. The same holds true in the case of all other sciences. The external world is infinitely rich, it is an inexhaustible mine from which physical science draws its facts. Now what are the sources of the psychologist? The psychologist cannot possibly go out into the forest, catch his specimens, dry them, and pin them for his observation and study.

This question as to the sources of psychology comes to us with greater force, when we realize, that psychological facts are not of the same order with those of the rest of natural physical sciences. It is, of course, evident that we must draw our material from consciousness, but where shall we turn to find the facts? Where are the particular localities from which we can work out and bring to light mental facts? Such is the difficult question that arises before the mind of the scientist, who has been trained in the school of concrete natural science. He finds himself helpless. The neurologist to whom a psychological training is truly invaluable, finds himself ill at ease when in his investigations he strikes a problem which has to be studied mainly from a psychological point of view. A piece of tissue, a lump of protoplasm, a nerve cell with its dendrons and axons can be stained, mounted, observed, and experimented upon, but who can get hold of a fact of consciousness, of an elementary psychic state, of a sensation, of a feeling, of an idea, stain them, put them under the microscope for scientific investigation? The facts of consciousness are so peculiar, so different in kind from those which form the subject matter of other sciences that they who are trained exclusively in concrete natural sciences are at a loss where to look for "real" psychological facts.

Some even go so far as to doubt whether facts of consciousness are "real" facts at all. Frequently I have heard from people with a good medical education, people who were far from being unintelligent, that they doubted the reality of psychic facts: "they are not anything! nothing substantial!" Comical as this last assertion may appear, one can understand its reason; one can understand the consternation and bewilderment of him who for the first time puts his foot on the threshold of psychology. What they meant to express was the strange experience of having been confronted with facts of a nature totally different from the ones with which they usually dealt. The facts with which they are conversant are of a tangible nature, but the facts of consciousness are not tangible, they cannot be seen, nor tasted, nor smelled, nor weighed by pounds and ounces, nor measured by rulers and compasses. In short, psychological facts cannot be reached by any of the sense organs; that is why they are such a puzzle, that is why some arrive at the conclusion that facts of consciousness can hardly be considered as facts, that they are not anything substantial. Still on further reflection any of these sceptics will admit that the phenomena of consciousness *exist,* and as such they must be *facts.*

In fact, if one wants to be a thorough sceptic, he may doubt the reality of the external material world. All that might be nothing but a dream, nothing but an illusion, a hallucination. We have no sure criterion of the truth of the external material reality, but one thing remains perfectly clear in all this destructive scepticism and that is the reality of the doubting thought, the existence of the sceptic consciousness. That is why Descartes, the father of modern philosophy, beginning with profound scepticism as to the reality of things finally found his criterion of the *truth* of real existence in his very doubting thought, and he expressed it in his famous "*Cogito ergo sum.*" Thought, therefore, is even more real than the objects of the material world, we know of the latter only through thought, through consciousness. In short, consciousness is a stern reality, and the phenomena of consciousness are real facts.

We may refer here to the behavior hypothesis recently advanced by Watson. The psychological knowledge of animals can only be obtained from the observation of their action, of their behavior, or of their adaptations to their environment. The same holds true in the case of human psychology. Man does not differ from other animals and should be studied in the same way. This, if I understand Watson aright, is essentially his position. Watson goes to the extent of denying the very existence of "centrally initiated processes," he reduces all psychology to peripherally induced processes, sensory and motor. He contests the presence or the very existence of images and denies the presence of any affective elements. Perhaps it may be best to quote Watson's own words:

"Having thus summarily dismissed the image and the affective elements, I crave permission to restate the essential contention of the behaviorist. It is this: the world of the physicist, the biologist, and the psychologist is the same, a world consisting of objects—their interests center around different objects, to be sure, but the method of observation of these objects is not essentially different in the three branches of science. Given increased accuracy and scope of technique, and the behaviorist will be able to give a complete account of a subject's behavior both as regards *immediate response* to stimulation, which is effected through the larger muscles; *delayed response,* which is effected through the same muscles (so-called action after deliberation)—these two forms comprising what I have called *explicit behavior;* and the more elusive types, such as the movements of the larynx, which go on in cases where action upon stimulation is delayed (so-called thought processes). This latter form of behavior, which manifests itself chiefly in movements of the larynx, but which may go on in (to the eye) imperceptible form, in the fingers, hands, and body as a whole, I should call *implicit* behavior. For years to come, possibly always, we shall have to content ourselves with experimental observation and control of explicit behavior. I have a very decided conviction, though, that not many years will pass before implicit behavior will likewise yield to experimental treatment.

"Possibly the most immediate result of the acceptance of the behaviorist's view will be the elimination of self-observation and of the introspective reports resulting from such a method."

The view taken by Watson is physico-biological. While one can sympathise with his views in making psychology more of a biological study, still one cannot help realizing the fact that he takes an extreme view when he wishes to reduce all mental processes to behavior. His view of affection as being essentially sense processes seems to be sound. He should not, however, involve his view of affection with the more narrow sectarian view of sex analysis forced gratuitously on clinical facts. Affection and emotion are no doubt peripherally induced and are probably due to the action of the central nervous system and glandular secretions of internal organs. In this respect one may fully agree with the behavior hypothesis. There is no need of invoking sex to that effect as Watson himself states it: "It is not essential to my contention that the above vague suggestion should be true. *It is essential to our position to have affection reducible to sense processes.* It is even more probable that the mechanism is glandular; that very slight increase in the secretion products gives us the one group; checking or decreasing the secretion, probably the other."

What, however, one cannot accept is the extreme view of the denial of introspection. Introspection will ever remain the fundamental method in normal and abnormal psychology. The very problem of sensations, ideas, images, thoughts, affects, emotions, has no meaning without introspection. *We must know the psychic states or mental processes from our own experiences.* Pain, pleasure, feelings, anger, fear, love, acquire their meaning only from the introspective attitude of the observer.

CHAPTER VII

PSYCHOLOGY AND PSYCHOPATHOLOGY

THE popular scientific literature of to-day often asserts dogmatically the belief that the investigation of the normal precedes that of the abnormal. This belief is erroneous and is only given credence to by people who had not thought much on the subject, and especially by those who belong to the so-called "new psychology" school. As a matter of fact the abnormal in scientific research precedes that of the normal. The investigation of the abnormal is one of the most potent instruments for new discoveries. The method of experimentation, the most powerful tool of modern science, is in fact the creation of artificial conditions, in other words, the effecting of abnormal states. Where the compound is highly complex, where the constituent factors and their relations are imperfectly or all but unknown and are not therefore under control, the spontaneous occurrence of some anomaly ought to be greeted enthusiastically, as it discloses the rôle played by the modified or excluded factor. This is specially true in the case of mental life, where the phenomena under investigation are the most complex in the whole domain of science, where a direct modification of the functioning mental activity is as a rule impossible without the production of some anomaly.

In the case of psychic life experimentation may be conducted on two different lines of research. The one is the modification of the objective content by means of changing the objective stimulus; the other method, and by far the most efficient and fruitful, is the modification of the very function on which the psychic content depends.

Memory, for instance, may be studied by giving the subject a series of auditory or visual impressions at given intervals, and then seeing how many of the series the subject can remember after a given interval. We can thus determine the rôle played by such factors as time, number of impressions, number of repetitions, etc. The function of memory remains the same, and only the stimuli of the psychic content are modified. We may, however, study memory from a totally different standpoint, and that is by the disturbance of its function. Disturbance of function may be studied in artificial states produced by drugs, or induced by hypnosis; or by investigating cases in which the function is accidentally disturbed, such, for instance, as are to be found in different forms of amnesia and aphasia.

The second method is by far the more important of the two, and is extremely valuable. For it is only by disturbances in the function of thought that we can learn something about the factors and nature of mental life. We cannot possibly learn about the nature of a process, unless we disturb it artificially, or unless we try to study cases in which we can find the process in different stages or degrees of perturbation; here one factor is missing, there another is exaggerated, and so on. From such cases it is easy to analyze the constituent factors and their interrelations. In mechanics, for instance, the law of inertia would have never been discovered, if not for the imagining of such a case as the absence of all friction, or its approximate removal. The ancients who looked to the ordinary phenomena of common life, that is to the normal, considered that bodies are bound to stop. The ancient physicists, relying on their observations of the normal, believed that bodies in falling traverse space in proportion to their weight; it required a Galileo to detect the fallacy and show that bodies, no matter what their size and weight be, falling from a high place or in a vacuum, fall to the ground at the same time. The same holds true in the case of chemistry; no observer of water in its "normal" state would have detected the presence of hydrogen and oxygen. Only under highly artificial or abnormal conditions was it possible to discover the constituents that go to make up the compound water.

If we turn to the sciences dealing with more complex phenomena, we find illustrated the same truth. We know how highly instructive Darwin found it to follow closely for a period of many years experiments of breeds in artificial selection, and to what capital account he turned his highly valuable observations of all forms of curiosities and monstrosities. We all know how valuable the observation and study of all forms of anomalies or variations from the normal type or species proved to the final establishment of the theory of evolution. The pre-Darwinian zoologist ignored variation regarding it simply as an exception to the normal, as a mere abnormality, as a pathological manifestation which is of little value to the scientist, who is only occupied with the discovery of general laws, laws of the normal. As a matter of fact, it was just these neglected variations, deviations from the normal that turned out to be at the very foundation of biology, revealing the nature and mechanism of the evolution of species.

The same truth we find illustrated in the investigations of the functions of the different parts of the organism. Experiments on animals such as vivisection, injecting of toxin matter, etc., experiments that actually mean the putting of animals in pathological states, as well as the investigation of pathological cases in man, have given physiology its most valuable treasures. Knowledge of the normal arises out of knowledge of the abnormal. In fact we may even say that the normal itself originates in the abnormal. It is in variations, in anomalies, that the normal species takes its origin.

Strictly speaking the normal is not at all a scientific concept, it is purely provisional in its nature, and holds only good from a restricted point of view in transitional stages of science. The normal is that which is common; the normal is the usual; and it is not the usual, but the unusual that gives birth to new life in science. The unusual attracts our attention and reveals to us the function and rôle played by the particular affected product in the total compound.

Taking all this into consideration, I think that they are wrong who insist that the abnormal can be known only from the normal. We can realize now how superficial are those who tell us "we learn but little from the abnormal, for first of all comes the normal." We realize now how detrimental to scientific investigation such a contention is. As a matter of fact the progress of science is not from the normal to the abnormal, but the very reverse, from the abnormal to the normal; the normal is but an arbitrary temporary concept, modified, and determined by the abnormal or unusual.

The supreme importance of pathological research holds especially true in the case of psychology, where the phenomena and the conditions on which these depend are so highly complex and so intricate, appearing at the same time so simple and taken as a matter of course in ordinary life.

As we have pointed out in the investigation of mental life we may either change the psychic or objective content, or effect changes in the mental function itself. In the study of vision, for instance, we may effect changes in the conditions of external objects, leaving the eye itself undisturbed. We may keep the object at different distances and study its appearances, put the object in water and have it refracted at different angles; we may look at it through different prisms, colored glasses or contrast its color when appearing in combination with other colors, whether it be successive or simultaneously. Instead, however, of effecting changes in the objects taken in by the eye, we may study the mechanism of vision by investigating the disturbances of the function of sight itself under the influence of drugs injected into the eye, or in different ocular diseases. The latter method is by far the more valuable for revealing the real mechanism of the visual apparatus.

Similarly in the study of memory we may follow the method of the German school, such for instance as that of Ebbinghaus and others, and investigate the laws of memory by analyzing the changes effected in its contents; or we may study the mechanism of memory by studying its disturbances in different forms of amnesia and mental diseases. Since psychology primarily deals with the laws of psycho-physiological functions, it will be admitted that the more important and valuable method is the one that has for its subject matter the changes going on directly in the material under investigation. The investigations, however, of changes or disturbances of mental function itself are really a study of the abnormal, researches into the domain of mental pathology. In psychology, as in many other sciences, especially those of the biological order to which psychology naturally belongs, the pathological method is by far the most important.

We can realize now the reason why it would be well for psychology to follow closely not the methods of physical sciences, but those of the biological sciences. The material with which physics deals lacks the pathological element, it can be introduced only figuratively, not so is it in the order of phenomena with which biology deals. In biology variations, abnormalities, pathological elements stand out in the foreground, and no step can be made without taking them into consideration. The psychologist in order to succeed and obtain more efficient and valuable results must keep in mind clearly the fact that the psychic process is a form of life in general, its phenomena are naturally related to the province of biology, and that of the highest part of it. The methods of psychological investigation must follow the line not of the physical, but of the biological sciences.

CHAPTER VIII

THE SPIRITUALISTIC AND MATERIALISTIC HYPOTHESES

IF we scrutinize more closely the science of psychology, we find that it is essentially dynamical in character. Consciousness is the subject matter of psychology; but consciousness is dynamic, it is first of all an activity, a process. Now all sciences that deal with processes cannot possibly help forming some working hypothesis that should unify the facts dealt with, and should above all be a guide for further research. Mechanics has its hypothesis of masses, forces, energy, inertia, conservation of matter and energy; thermotics its molecular energy; electricity its ether vibrations and currents; chemistry the affinity of atoms; dynamic physiology has its reflex processes; what is the fundamental hypothesis of psychology?

We find the following hypotheses:

(I) The Spiritualistic, or soul hypothesis,
(II) The Materialistic hypothesis,
(III) The Faculty hypothesis,
(IV) The Transmission hypothesis,
(V) The Psycho-physiological hypothesis.
    (a) The Metaphysical,
    (b) The Positive.

We give here a brief review beginning with the spiritualistic hypothesis. At the very outset I must caution the reader against the grave error of confounding spiritualism with spiritism. The latter is a religious doctrine of life after death, and of the influences of natural or resurrected spirits; the former is a philosophical theory, hoary with age, that attempts to explain the phenomena of consciousness. Such men as Lotze and Ladd are ardent advocates of spiritualism. According to this hypothesis there exists a spiritual substance, a soul, that acts in all the processes of consciousness. The soul is the immutable principle that unifies all the phenomena of consciousness; in other words, all mental processes are but manifestations of the soul's activity.

The medical man trained in the school of concrete physical sciences may smile, if not sneer, at the mentioning of the "soul." Such a hypothesis is in his opinion nothing but an anachronism. He may consider it as a theory long exploded by science and now only lingering among the lower ignorant classes, a theory which an intelligent scientist should be ashamed to introduce into his work even for the sake of discussion, and elucidation of his subject,—the "soul" is nothing but superstition. To call a theory superstition does not refute it. The significant fact that Prof. Ladd in his volume on physiological psychology defends it valiantly, that Sigwart in his "Logic" takes up arms for it, and also that such a great thinker as Lotze, himself a medical man, takes it under his protection and finds it perfectly rational, and in fact the only tenable hypothesis, seems to show that there must be something in the "soul," and if superstition it be, it is one that has to be reckoned with, and not dismissed with contempt. We must, therefore, examine the reasons and facts that urge some thinkers and scientists to accept the soul as a working hypothesis for the phenomena of consciousness. There are two weighty considerations that are strongly in favor of spiritualism.

We have already pointed out in a previous discussion that mental phenomena are different in kind from those of the material world. A feeling, an idea, an image, a thought have neither length, nor breadth, nor heighth, nor weight; no psychic phenomenon can be expressed in terms of material magnitude. Hence, conclude the spiritualists, consciousness is different in kind from matter, it is a different substance, a soul.

Another great point upon which spiritualism rests is *mental synthesis*. We find that in consciousness, sensations, ideas, thoughts, feelings, are not juxtaposed as are the particles of some material body, but are in unity, in synthesis. The chair seen yonder consists of numerous impressions, sensations and ideas, but all these do not appear in consciousness in their bare separateness, but are synthetized in one percept, a chair. The various experiences that reach the mind, in spite of all their multitudinousness are still brought into relations and are unified, synthetized into the unity of consciousness, they are all referred to the same personality. Now reason the spiritualists, many different phenomena will remain in all their manifoldness and will not give rise to a unity, unless there is a medium through which they are unified. If a resultant is to be formed there must be something on which the forces that are to form the resultant, impinge. If then we do not assume the hypothesis of a spiritual substance, mental synthesis is incomprehensible, if not impossible.

We must now point out the weakness of the soul hypothesis. The argument of spiritualism, that because mental facts differ in kind from material facts, a spiritual substance must be assumed to exist is certainly fallacious. Phenomena may differ fundamentally and still we have no right whatever to conclude that they require two different substances. Time is different from space, but are they two different substances? Consciousness may differ widely from matter and still require no one simple substance for its existence and activity.

The only solid argument that remains for the soul hypothesis is that of mental synthesis. The very consideration, however, on which the spiritualist lays so much stress serves as his best refutation. That phenomena of consciousness differ radically from material ones is a fundamental proposition with the psychologist in general, and with the spiritualist in particular, but this is far from supporting spiritualism. On the contrary, it overthrows his last stronghold. For if mental facts differ in kind from physical material facts, it is poor reasoning to raise difficulties pertaining to one region, and carry them over into a totally different one. It would be senseless to raise aesthetic difficulties in chemistry or mechanics, but it is no better to reason that because a medium is required for physical objects, movements, forces to combine their effects in one resultant, therefore, a medium, a substance, a soul, is also required for a synthesis of a totally different order of phenomena, those of consciousness. The two orders differ in kind, and what is found necessary in one, is not for that reason also proven to be indispensable to the other. It must first be proven that the conditions of unification are the same in both before the argument from mental synthesis may be accepted as valid. States of consciousness may become synthetized, without any medium, without any *tertium quid,* without any soul.

The spiritualist by his "soul" hypothesis really undermines his own position. For if it be granted that the conditions of unification are the same in mental as in physical activity; that a medium is required in both in order to get a unity, a resultant, then the whole "soul" structure tumbles to the ground. Material and mental phenomena cannot possibly belong to two radically different substances, if the conditions of their activity are exactly of the same nature. It would have been perfectly logical had the difference between consciousness and the physical world been asserted and emphasized, and had the medium, the soul, been totally left out.

The greatest difficulty, however, which the spiritualist encounters is the interaction of the two substances. If matter and soul are different in nature how can they interact, how can they come into any relation? Hours in so far as they are different from pounds, or miles, have nothing in common, and as such do not interact; an hour cannot modify a pound, nor can pounds change hours, and if this holds true of phenomena of the external world where the difference after all is not so very great, it must with special force recoil on the spiritualist where the soul and body are so totally different in all respects. The only way out of the difficulty, if one is consistent and is not afraid to take the consequences, is to introduce the miraculous and say that the interaction is due to the intervention of the deity. This view was in fact taken by the followers of Descartes. The spiritualist, however, with a philosophical and scientific training will rather be inconsistent and support his view by all kinds of props than to accept such a conclusion, because he knows that it practically means defeat, it means that the hypothesis is not working, and that the soul must take shelter under the wing of the deity, the refuge of ignorance.

From a purely scientific standpoint we must reject this soul-hypothesis. The first requirement of a scientific hypothesis is that its hypothetical cause should be of such a nature as to be verifiable by experiment and observation. Now in the case of the soul, this condition is not fulfilled. The soul is something that lies outside the range of experience, and could never be brought within the limits of empiricism, the basis of science. The spiritualist, in fact, has not even a positive notion of his "soul," he either frames it in wholly negative terms, that it is not changeable, that it is not material; or, if pressed hard, he falls back on the phenomena of consciousness, the very phenomena the soul is called for to explain.

Furthermore, a scientific hypothesis is justified and found useful, if shown that it makes the facts more easily understood. This cannot be shown in the case of the soul. As a hypothesis the soul is useless and scientifically unjustifiable. The acceptance of the "spirit," of the soul, does not make it a bit easier for us to comprehend the *modus operandi* of the states of consciousness. The soul is an immutable, indefinite, indescribable, incomprehensible being, and the insuperable difficulty of how it gives rise to conscious activity requires another hypothesis. If mental phenomena present difficulties, spiritualism doubles them. The soul in fact, is the "double," the ghost of consciousness. The soul is an unverifiable superfluous entity, it is not a *vera causa* in nature; it explains nothing, and without removing difficulties is only introduced as an additional burden.

Before we dismiss the soul hypothesis, we may point out that it must be rejected on quite different grounds,—

it is at bottom unscientific, it is metaphysical, it goes into the ultimate nature of things, an investigation that does not fall within the province of science. The soul-hypothesis assumes the existence of an abiding unchangeable entity behind the veil of mental phenomena, an entity which in the flow and change of the phenomena remains the same and is the *really real,* the ultimate nature of the facts of consciousness. This belongs to the ontological part of metaphysics, but should not be introduced into science. The reader will realize now, why the whole complicated "soul discussion" is taken up here. It is to emphasize the fact that psychology has nothing to do with substances, noumena, entities, and quiddities, that psychology has nothing to do with the "inner nature" of consciousness. Psychology, like all other sciences, describes, classifies, and investigates by means of observation and experimentation *facts* of consciousness and their relations, and endeavors to express these relations in general formulae or laws; all attempts to make of psychology more than this can only result in bad metaphysics.

The materialistic hypothesis is even worse metaphysics than is the spiritualistic one. It is a hypothesis which in spite of its evident absurdity is none the less in favor with some representatives of the medical profession. Matter and force, as Büchner puts it, give rise to, or produce consciousness, or as Cabanis and Moleschott express it "the brain produces thought as the liver secretes bile." This hypothesis is unscientific and metaphysical, because it attempts to penetrate into the *inner nature* of consciousness, and claims to have it resolved into "matter." It is bad metaphysics, because it takes its "matter" on trust, without any critical reflection. Moreover it is more crude and worse metaphysics than is the soul hypothesis, because it lacks even the recognition of the most elementary, psychological proposition, namely the knowledge of fundamental difference between mental and material phenomena.

Turning now to the faculty-hypothesis, we find that it is nothing else than spiritualism under a somewhat different form. The faculty-hypothesis chops the mind into many different parts, termed faculties, one is for reading, another for speaking, another for remembering, another still for willing, and so on. Sometimes they are limited to a few, and sometimes they are multiplied to infinity.

The faculty-hypothesis is a cheap edition of spiritualism, it is spiritualism many times over. Instead of one soul it has many of them. Spiritualism has but one difficulty and that is the soul which, like an omnipotent deity, presides in some mysterious way over mental and organic activities. The faculty-hypothesis has an infinite number of them, inasmuch as it multiplies the deity into an endless number of gods and spirits that take charge of different psychic and psychomotor departments.

One can see the reason of the faculty hypothesis. It originated with people who as a rule are inclined to accept uncritically words for realities. Thus, will, memory, words that are only collective terms for many different states of mind, names furnished by the language of unreflective common sense, are naively taken as indicating some substantial entities, or little spirits existing somewhere in the brain.

CHAPTER IX

THE TRANSMISSION HYPOTHESIS

THE transmission hypothesis advanced by James is a modification of the soul hypothesis. The transmission hypothesis postulates the existence of a physical world and of an independent universe of consciousness. Consciousness, however, cannot manifest itself in this sublunar world without the occurrence of definite physical changes. That level of physical changes which makes the manifestations of consciousness possible is termed the physical threshold. Now the ocean of consciousness pours forth its psychic waves into the material world with the rise and fall of the physical threshold. The threshold is to be pictured as a sort of flood gate regulating the volume and intensity of the transmitted current. The rising of the threshold diminishes the psychic stream, while the lowering of the threshold permits a greater volume of consciousness to pour over into our physical world.

The transmission hypothesis has certain advantages over the previous ones discussed by us. While this hypothesis postulates the independence of consciousness, it is also in accord with the scientific proposition now generally accepted, namely that mental life is somehow connected with or is a function of brain activity, only specifying that this function is one of transmission. It claims to fall in line with the threshold concept of psychophysics as worked out by Fechner, and further harrowed by the "new psychology" movement; moreover, it is comprehensive enough to embrace all the facts and speculations brought out by recent investigations in the domain of mental pathology.

The transmission hypothesis, however, has also disadvantages which are of such a grave nature as to make one hesitate to accept it. The transmission hypothesis from its very nature is unverifiable. For, if, by hypothesis, consciousness manifests itself in this sublunar world (the only one we know) only under physical conditions, how can we ever come to know and verify a postulated world of pure consciousness? Being outside the domain of our psychophysical world, the universe of disembodied consciousness cannot, by hypothesis, furnish us the means for its verification. In this sublunar world we can know of the existence of consciousness through its physical expressions, through its being embodied. How then, can we ever reach a universe of disembodied consciousness? But a hypothesis which from its very nature is not verifiable cannot possibly be accepted.

The transmission hypothesis is all the more unacceptable as the terms in which it is expressed are contradictory, and the analogy on which it is based is essentially illegitimate. Consciousness is supposed to be different in nature from the physical world and existing independently, the psychophysical threshold alone regulating the volume of the stream of consciousness to be poured over into the material world. The threshold then which is physical in character limits consciousness, but how can the two be limited by each other when they are totally different in nature? In assuming two different universes, we assert that the two cannot limit each other, but in examining again the concept of threshold we make a contradictory assertion that the two can and do limit each other.

The very analogy on which the concept of "transmission function" is based is illegitimate when applied to consciousness in its relation to the physical world. The concept of "transmission function" can only be applied to a case where the transmitter and the thing transmitted are of homogeneous terms, but not where the terms are essentially heterogeneous. A stream of liquid can be transmitted through a pipe, a beam of light through stained glass, or a Runtgen ray through soft or more or less rarified cellular tissue. Both the transmitter and the material transmitted are physical in their nature, but how can an idea or feeling such as our idea of eternity, or of infinity, or aesthetic, or moral sense be transmitted through a tube? How then can we apply the concept of transmission-function to consciousness and the physical world where the two are totally different in nature? The analogy is figurative and scientifically illegitimate.

The transmission hypothesis sins further by reason of its transcending the legitimate grounds of psychology. It assumes an independent world of consciousness which cannot be brought within the range of experience. Now even if it be granted that such a world does exist, it still falls outside the subject-matter of psychology. For psychology as we pointed out deals with *facts* of consciousness, with *experiences* and their relations. If it be objected that every hypothesis is extra-experiential, it may be pointed out that a hypothesis must be framed in terms that can be drawn within the circle of experience, it must use a *vera causa,* an agent that is observable in nature. But, as we have already shown, the transmission hypothesis lacks this essential requirement. Its agent, *disembodied consciousness*, is not a *vera causa*, nor can it ever be drawn into the circle of experience. A good hypothesis must be framed with a view of becoming a possible *fact*, but this hypothesis from its very nature disclaims this possibility, since its agent is in a region that lies outside our world of experience.

For this very last reason, namely, for speculating in things extra-mundane, the hypothesis may also be charged with committing transgressions in metaphysics. Such a hypothesis is the more metaphysical as the phenomena under consideration are dealt with as if they were entities.

Furthermore, the hypothesis only seemingly holds to the empirical law that consciousness is a function of the brain. For if consciousness is in a separate world all the psychic phenomena are in existence from all eternity, ready made, the phenomena of consciousness have really nothing to do with the brain, inasmuch as they exist from all eternity, in a region outside and totally independent of the brain. Thus the hypothesis by its very character, even if the matter be regarded from a purely logical standpoint undermines the proposition which it undertook to explain, and as such can hardly be considered as valid.

Finally, it may be urged, that the invocation of an extra-mundane world helps matters little, as it does not show the *modus operandi* of the interdependence of mental and physical phenomena, inasmuch as the rising or falling of a physical threshold does not in the least explain or show how a stream of consciousness is made possible to vary in volume and intensity. Without explaining the proposition that mental processes vary as physical processes, the transmission hypothesis only assumes an additional world of disembodied consciousness and thus gratuitously multiplies entities.

CHAPTER X

THE METAPHYSICAL HYPOTHESES OF PARALLELISM

THE Spinozistic doctrine of parallelism claims that the mental and physical orders run parallel to each other, taking its stand on purely metaphysical grounds, namely, on the existence of one substance with an infinite number of attributes, all expressing the nature of this substance. Two of these attributes, being mind and matter which in an infinite number of parallel running modes or phenomena express the nature of this one substance. A modification of the unitary substance regarded under the attribute of mind is a mental mode or phenomenon. The same regarded under the attribute of matter or extension is a material mode or physical phenomenon. Mental and physical phenomena are both manifestations of one unitary substance. There is no need for me to point out that this double aspect of one unitary substance belongs to metaphysical dogmatism, of substantialism, and as such cannot possibly be admitted into the province of psychology as a natural science.

The voluntaristic school does not acknowledge a strict parallelism in the sense of a double aspect of the same unknowable or of two infinite attributes of the eternal nature of the same substance, but it does teach a psychophysiological parallelism, grounding it on the double aspect, subjective and objective, of one "unitary" experience. This differs but little from the substantialistic dogmatism. Instead of one unitary substance the voluntarist substitutes a no less metaphysical category of "unitary experience."

Another metaphysical view of the new associationist or sensationalist school grounds parallelism on epistemological and metaphysical grounds. Psycho-physiological parallelism is partly a matter of pure definition, partly a matter of philosophical considerations. This school defines a psychic object as one belonging to a single subject, one individual only, while a physical object is one belonging to many subjects. Now, reasons this school, if psychology is to be a science at all, it must surely be of such a nature as to be communicated to other subjects, that is, it must become common property, and since by definition, only a physical object is an object of many and is communicable, hence a psychic object to become communicable must be expressed in physical terms.

This excursion into the region of metaphysics and epistemology of the otherwise matter of fact and common sense school is the result of good intention of being thorough-going, hence, this metaphysical definition of mental and physical phenomena of the "one" and the "many."

Another argument adduced by the same school seems to be somewhat more sound. Physical facts it is alleged have a necessary causal connection, while psychic facts are only connected by association, which is not one of necessity. An idea *a* is sometimes followed by idea *b* and sometimes by idea *c* and so on. There is no invariable connection in psychic life, such as is to be found in physical facts. The soundness of this argument, however, is rather questionable. For it may be contended that no fastening bonds are ever observed in physical phenomena, the only thing observed is a relation of sequence of antecedent and consequent, and in case of causation an invariable sequence of a definite antecedent and definite consequent. Now psychic facts also manifest relations of sequence, we observe antecedents followed by consequents.

The argument that an idea is sometimes followed by one and sometimes by another idea showing the absence of invariable sequence is, if looked at closer, of a rather dubious character. An idea *a* or idea *b* is only objectively the same, by having the same object, but the thought, mental stream, or moment consciousness that possess that idea may not be the same, but it is just this mental stream, the moment-consciousness that determines the content of the succeeding idea. The thought of *a* is different according to the difference of the mental stream or moment consciousness. It is one of the psychologist's fallacies to consider that if the object is the same then the thought that possesses the object must also be the same. Now ideas of the same *a* are totally different in different mental streams, just as two different minds regarding the same object have absolutely different psychic states. It is therefore clear that an idea *a* may be sometimes followed by *b* and sometimes by another idea. An idea *a* followed by *b* is altogether different from idea *a* followed by *c*. It is only the recurrence of the *same* mental stream or moment consciousness that would give the same sequence. This is clearly observed in hypnoidic states where the same moment consciousness recurs, the same sensations, ideas, feelings, and actions follow in invariable succession.

CHAPTER XI

THE UNITARY EXPERIENCE OF VOLUNTARISM

IN the course of our discussion, we had again and again to refer to the data and postulates of psychology. It would be well to give now a short review of them so as to bring them clearly before the mind of the reader. The fact that the postulates are not kept clearly in view leads one to commit many a fallacy.

Psychology assumes the validity of unanalyzed criteria of reality taken as valid by common sense. The verification of illusions, hallucinations, and delusions is finally based on the dictum of common sense. The work of science may after all be nothing but an illusion, an hallucination, or a delusion of consciousness. What keeps up the scientist in his work is his firm belief that mankind believe in it, and that when other people are put under the same conditions they will verify his experiences.

Science assumes the postulates on which all experience of common sense is based. Science furnishes our knowledge of the external world, but science is essentially not self-conscious, and it cannot therefore on its own grounds answer the question as to the validity of its knowledge. Is there something independent in that externally perceived object, the house, for instance, or is the psychic account all there is to it? This is a problem not to be answered on psychological grounds. Knowledge, its possibility, its nature, and its *general* aspect must be taken for granted. Psychological knowledge, general for all subjects must be assumed, as well as general knowledge of the objective world. The psychologist, like other scientists, must assume that his experiences are so conditioned, that though they may be unique, still if others were to be put under the same conditions and confronted with the same external realities, they would pass through similar experiences. In short, psychology assumes the validity of its knowledge, its *general* validity for all knowing subjects, also knowledge of an externally existing object, analyzed from the subjective standpoint into its psychological elements. Psychology, therefore, has really far more assumptions at its basis than any other natural science, for in addition to the assumption of the existence of an external world it must assume a knowing or sensitive subject, and also the interrelation of the two.

It is true that the so-called "Voluntaristic school" claims that psychology is the only science that has no assumption at its basis. The representative of that school claims that there is but one "unitary experience." From this "unitary experience natural science abstracts the knowing subject and as such deals with abstract mediate experiences requiring auxiliary assumptions, not so is psychology which deals with experience as it is immediately presented to the experiencing subject." According to the voluntarist natural science deals with mediate experience, while psychology deals with immediate experience requiring no assumptions.

This argument is questionable on the very face of it. For the existence of that "unitary experience" is itself an assumption; it implies that the experience and the object given by the experience are one. Such a unification of experience and external object implied in "unitary experience" is a metaphysical assumption which idealistic philosophy may prove as being true, but which the psychologist can not possibly accept as given directly by experience itself. Furthermore, the concept "experience" cannot stand by itself, it implies assumptions; an experience must be of something that lies outside that experience. I have an experience of a house yonder, but the house yonder is not an experience unless regarded from a metaphysical or epistemological standpoint, but then we overstep the boundaries of psychology which deals with experiences of individual organisms and enter the field of philosophy that deals with experience in general.

In taking the most simple psychological element, namely sensation, we have its correlative in the external stimulus; there can be no sensations without a stimulus, but that stimulus is no longer a sensation nor is it any other psychic process, such for instance as an idea. Psychologically considered the identification of the stimulus with psychic state or process is incorrect, because it would mean that all sensory processes are initiated only by sensations or ideas.

Again, if we come to ask in what sense we understand the concept "immediate experience," we find further difficulties. For if the consciousness be of the anoetic type, to borrow the term from Stout, there is neither mediate, nor immediate experience; if the consciousness is of the noetic type it is questionable as to what we mean by "immediate." For it may be contended with the modern realist that the knowledge of the object as given in sensation is immediate, while the knowledge of sensation itself with which psychology deals is not immediately given; it requires a long training before this is separated and sifted from experience; the psychological aspect of experience is really secondary, and as such mediate.

If by "immediate" we mean to indicate the fact that the psychic process must antedate the knowledge of the external objective world, the proposition can be contested once more; for along with the psychic process the object also is given; especially is this true of the idealistic metaphysical presupposition of the voluntaristic school that identifies the objective world with the given primary experience. The objective and subjective aspects of the "unitary experience" are both supposed to be given together and, as such, are both immediate. Natural science abstracts the subjective aspect and psychology abstracts the objective aspect the "mediate experience." We should, however, question the term "mediate experience." What may "mediate experience" mean? If experience has any meaning, it means something gone or lived through directly, immediately; but then all experience is immediate, otherwise it cannot be experience. A mediate experience as contrasted with immediate experience can only mean experience inferred, experience not experienced, a concept contradictory in its very nature and definition, and must be therefore rejected as a meaningless term. The fact is, that "mediate experience" is an inappropriate and misleading term for physical processes which as such are neither experience nor mediate.

The very statement of the voluntaristic psychologist discloses the hidden assumption. There is a unitary experience which falls asunder into mediate experience of natural science and immediate experience, the subject matter of the psychologist. If this be so, then the psychologist does not deal with the totality of experience. Since the mediate experience—part of the "unitary experience" falls outside its domain, it deals only with experience in so far as it is regarded as immediate. Evidently psychology requires presuppositions to supplement the abstracted mediate aspect of the unitary experience. For the voluntaristic school will surely admit that unitary experience is given neither in the mediate aspect nor in the immediate aspect alone, and as science deals either with the one, or with the other, presuppositions are *ipso facto* also indispensable in psychology.

Moreover, psychology even from the standpoint of the voluntaristic school requires more presuppositions than the natural sciences. For experience, even if it be immediate, must still be of something other than itself. The sensation white is of *something* white, the touch sensation hard is of *something* hard, the pain sensation prick is of *something* sharp, and so on. Now if this something, if that other of which there is immediate experience be the so-called "mediate experience" as this is the supplementary part of the unitary experience, of the total reality, then "immediate experience" is experience of "mediate experience." The science then that deals with immediate experience must postulate mediate experience as one of its fundamental presuppositions. Thus we come once more to the conclusion, and this time from quite a different standpoint, that psychology as science in general has its presuppositions, and that it furthermore presupposes all the presuppositions of the natural sciences.

Psychology explains the subject and object in consciousness, and that only in relation to the question of "how,"—how we come to know this or that object, but whether there *is* an object or subject independent of the experiencing thought; *what* the nature of that object or subject is, whether of mental experience stuff or of some extra-mental material, is a question that does not belong to the domain of psychology. The answer is differently given by the idealist, materialist, realist, monist. In short, the problem of "what" belongs not to psychology, but to the province of metaphysics. The Voluntaristic school in denying all presuppositions in psychology starts with a purely metaphysical speculation of the idealistic stamp, namely, in postulating that the external object of psychic experience is identical with that same experience. Psychology or any other science must reject unhesitatingly such metaphysical speculations.

CHAPTER XII

THE INDUCTIVE BASIS OF THE POSITIVE PSYCHOLOGICAL HYPOTHESIS

IT now remains for us to examine the psycho-physiological hypothesis. This last hypothesis fully accepts the difference between the two series of facts, the material and the mental, but instead of going to look for "the other side," instead of going into metaphysics, it takes the two different series as its data, and considers them as *co-ordinate*. It does not trouble itself as to whether there is a soul behind the scenes, all it has to consider is facts, phenomena that can be observed and experimented upon. The co-ordination it assumes is not an assumption based on abstract philosophical speculations, on subtle hair-splitting, but is based on experience.

Numerous facts from pathology and experimental physiology go to prove that mental states have their physiological correlatives. It is enough to mention the fact of the influence of toxic matters on the brain and the effected mental disturbances. In alcoholic intoxication, for instance, we first meet with an unloosening of higher psychic inhibitions; in the initial stage of intoxication there is an apparent heightening of mental and motor activity, and then as the quantity of the poison absorbed by the blood and conveyed to the cerebro-spinal nervous system is increased, a progressive paralysis of psychomotor life sets in. At first the highest psychic functions, the moral and intellectual processes are disturbed and finally paralyzed; and this paralysis slowly descends to the lower and more stable functions, such as speech and writing, then affecting the coordination of grosser movements, such as running, walking, standing, sitting; and as the action of the poison increases, the organic, respiratory functions become affected, finally ending in death. Different drugs and poisons that act on the cerebro-spinal nervous system produce different symptoms, but all of them, while influencing the physiological nervous processes, at the same time have their action manifested by a parallel modification of psychic processes. Illusions, hallucinations, and delusions, changes in reasoning and willing, changes in memory, amnesia and paramnesia, all these can be induced by the influence of poisons. Thus we find that the two series of phenomena, the psychic and the physiological or physical are intimately related.

Pathology and psychiatry with their vast stores of facts go to confirm the psycho-physiological hypothesis. In general paralysis, for instance, we meet conditions somewhat similar to those of alcoholic intoxication. At first inhibitions are removed, the psychomotor processes become deranged and slightly stimulated, sooner or later to be followed by gradual paralysis. The process of dissolution progresses from the highest, most complex, least stable functions, memory, intelligence, will and so on, to the lower, less complex and more stable functions, reading, writing, playing, etc., finally reaching to the very lowest, to the simplest co-ordination of movements, mastication, swallowing, etc. A post-mortem examination of the brain uniformly reveals a profound degeneration of the brain cells. In the various forms of epilepsy and in most cases of chronic insanity, ending in dementia, we find on examination as a rule, some degeneration of the brain cells.

In cases of the many forms of aphasia, science triumphed in discovering the brain lesion. In motor aphasia the third frontal convolution, or that of Broca is found to be degenerated, in sensory aphasia the degeneration is in the first temporo-sphenoidal convolution, or that of Wernicke. In many other nervous diseases where there is a profound change in the sensori-motor functions, such as posterior spinal sclerosis or locomotor ataxia, acute ascending paralysis, acute poleomyelitis anterior, syringomyelia, etc., we also find degeneration in some one part of the cerebro-spinal nervous system. Thus in tabes we find a degeneration of the posterior root zones often associated with similar lesions in the intramedullory continuation of the several cranial nerves. In poliomyelitis anterior we find an inflammation of the anterior cornua (sometimes extending in the antero-lateral columns); the multipolar cells with their dendrons and neuraxons are destroyed. In syringomyelia we find the formation of one or more cavities within the substance of the spinal cord, usually within the horns of the gray matter the cavities being filled with a fluid which is either liquid or gelatinous. We find in these diseases definite organic changes concomitant with definite sensori-motor modifications.

In the functional diseases belonging to the province of psycho-pathology, diseases such as are known under the vague term of hysteria in all its protean manifestations, the different forms of anaesthesia and amnesia, abulia, psychopathic chorea, astasia-abasia and numerous others, where no organic lesion in the cerebro-spinal nervous system can possibly be discovered, we have good reasons for suspecting some functional derangement in the psysiological processes of the nervous system. My own psycho physiological investigations in this line tend strongly to confirm the theory that all functional diseases are *disassociations* of functioning brain cell-systems, and that the gravity of the disease depends on the extension of such functional dissociations. Thus we find that neuro-pathology and the recent science of psycho-pathology with all the wealth of facts and discoveries at their disposal give evidence of the truth of the psycho-physiological hypothesis; in fact, this is their only working hypothesis *sine qua non* the very existence of these sciences.

The psycho-physiological hypothesis finds special support in the brilliant investigations of experimental physiology. The experiments of Munk, Ferrier, Hitzig, Brown-Sequard, Goltz, Schiff, and others clearly show the correlation of brain functions with psychic activity. They show, for instance, in animals that the physiological processes in the occipital lobes are correlated with vision, that those of the temporal lobe, especially of the superior temporo-sphenoidal convolution are correlated with hearing, that sensations of smell are concomitant with the function of the median descending part of the temporal lobes, that taste is probably correlated with the processes of the lower temporal regions, that tactual sensibility is intimately connected with the physiological processes of the motor zone; and the recent researches of Bianchi and Flechsig tend to correlate the highest psychic activity of man with the function of definite areas in the cortex.

Should we care to look for more proofs as to the validity of correlation of psychic with neural, or physical processes, we can also find it in another branch of experimental physiology, namely, physiological psychology. Thus Doctor Lombard by placing sensitive thermometers and electric piles against the scalp noted a rise in temperature during intellectual effort, such as calculation, recitation, composition. The temperature showed a marked rise exceeding 1° F. during an intense emotion. When intellectual activity rose in intensity there was also a parallel rise in temperature, thus the temperature was found to be higher, when poetry was recited silently than when the same was done aloud. Similar results were arrived at by Schiff in his experiments on dogs. He placed thermo-electric needles on the scalps of dogs; the sensations of the animals were then tested with different kinds of stimuli. It was found that whenever the stimulus was given and the sensation experienced, that a change was at once manifested in the cerebral and motor processes which was indicated by the deflection of the galvanometer. When the dog was lying motionless and a rolled up piece of paper was given to him, the galvanic deflection was small, when, however, a piece of meat was brought near the dog, the deflection became considerable. Galvanometric deflections concomitant with psychomotor activities have also been shown in the case of human subjects.

The ponograph is well adapted to demonstrate in a striking way to the doubting layman the intimate relation of physical and mental phenomena. The subject is put on table, which is so delicately balanced that at the slightest alteration in the distribution of the weight of the subject, it tilts. Now it is found that when the subject is spoken to, or when making some intellectual effort, the table at once tilts, possibly because of the increased blood supply to the brain and more especially on account of the motor reactions. Pneumographic, plethysmographic, carotidographic, cardiographic, automatographic, ponographic, and ergographic tracings show physiological changes concomitant with the slightest modification of psychic processes. As simple an instrument as the sphygmograph can demonstrate the same truth. A sphygmogram taken under mental activity differs from the one taken under mental repose.

All these facts, and many more could be adduced to establish on a firm basis the psycho-physiological hypothesis that psychic phenomena are accompanied with physiological or physical processes. The whole of recent psycho-physiological research work is based on the hypothesis that there is no psychosis without neurosis. *The two are concomitant. Psychic and physical phenomena go hand in hand, the two processes run parallel to each other. Thus we find that psycho-physiological parallelism is a strictly scientific hypothesis.*

The psychic and physiological series of changes are concomitant, parallel, but they do not stand to each other in relation of antecedent and consequent, they are not *causally* related. I take here the opportunity of emphasizing the *non-causal* relation of mental and physiological processes. It is usually taken for granted by many medical men, and even by some scientists, neurologists, physiologists, biologists, who do not happen to think out clearly the more theoretical aspects of their investigations, that brain processes are the direct cause of mental phenomena and that psychology therefore is nothing but a chapter in physiology. Study the brain and you will know all about psychic life. This view is certainly fallacious. A psychic fact as we have pointed out is radically different, different in kind from a physical, mechanical fact. One cannot, therefore, give rise to the other.

The reason why it is thought that physical processes give rise to mental, lies in the fallacious analogy taken from the law of convertibility and equivalence of energy in the activity of physical processes. Heat, it is reasoned, can be converted into electricity, electricity into magnetism, magnetism into motion, motion into sound or light, and the same may be done in reverse order; the energy of physiological processes therefore is converted into mental, or psychic energy. The whole reasoning is wrong. We must remember that what underlies all these different physical phenomena is various forms of molecular and molar motion, and when one order of physical phenomena passes into another, it is after all only the transformation of one form of motion into another form. Quite different is it in the case of the phenomena of consciousness. The activity of consciousness is not a form of motion, and the two therefore, cannot be converted into each other. Mental activity is but figuratively termed energy, just as a well reasoned argument may be characterized as clear and lucid, but it does not mean that one can see a candle shining through it. The energy of mental phenomena is as much the energy of physical and physiological sciences as the idea of a brick *is* a brick itself and made up of clay.

Furthermore, were it possible that a physiological process should be converted into a mental process, the law of conservation of energy would have to be given up, and along with it the whole edifice of modern science would tumble to the ground. For according to the law of conservation of energy no physical energy can possibly be lost. One form of energy may pass into another, but the physical energy which is some form of motion, molar, molecular, atomic, ionic or electronic cannot be lost, that is, there must always be so much motion, no matter under what form it may appear. Now on the one hand, were it possible that a physiological process, which is nothing but a form of physical energy, could pass into a psychic state, which is no motion at all, we would really have a loss of energy. Were it on the other hand possible that a mental or psychic process should pass into a physiological process, we would have had new energy generated, energy that is not a transformation of some previous existing energy, or physical activity.

If mental and physiological processes were to stand to each other in relation of antecedent and consequent, in relation of cause and effect, we would have had with each beat of consciousness a new creation of physical energy and a loss of it with each cerebral process. This would be sufficient to undermine the basis of science, and practically we might have had good hopes that in the near future our steam engines would be run by good intentions and windmills by aesthetic feelings.

Psychic and physiological series are no doubt intimately related, but their relation is not causal, they do not stand to each other in relation of invariable succession characteristic of cause and effect, but in that of *co-existence*. The two series of processes are concomitant, they run parallel to each other, but neither is the cause of the other. A change in the one means also a simultaneous, concomitant modification in the other. In other words, every psychic change must have its physiological concomitant, and *vice versa,* every physiological process may have its psychic accompaniment. This hypothesis of psychophysical parallelism is at the basis of all modern psychophysiological, neurological, and psycho-pathological investigations, inasmuch as it is taken for granted that for every manifested sensori-motor or ideo-motor "symptom" there must be present term for term some physiological process. Psychology takes the same view and accepts the same hypothesis; it does not trouble itself in the least with the philosophical problem as to whether the two series of phenomena, the mental and the physical, have behind them separate substances, or whether they are but two different aspects of the same thing. This belongs to metaphysics. The psycho-physiological theory like all other scientific hypotheses has nothing to do with metaphysical substrata, but deals only with facts and their relations.

CHAPTER XIII

THE DEDUCTIVE BASIS OF THE POSITIVE PSYCHOLOGICAL HYPOTHESIS

THE concept of causality cannot be worked in psychology in the same way as it can be done in the physical science. The circle of physical processes is complete in itself. A physical process without ceasing to be physical can be traced endlessly in the past or future, all the links of the endless process must all be physical in their nature. For if we permit in the endless chain of links of the physical process any other but physical links to be interpolated, all the physical sciences must fall to the ground, since at any stage we may get hold of a process of which the antecedent link is not of a physical nature. In short, the postulate that forms the basis of physical science is that the antecedent and consequent of a physical process taken at any stage of the process are physical in their nature. This is the principle of continuity. The whole edifice of the physical sciences is based on this principle.

If we now turn to psychology, we find that it cannot be based on a postulate of similar character. Psychology cannot possibly work on the assumption that the processes it deals with can be traced endlessly in either direction, past, or future. Unlike the physical, the psychic process is finite and final,—it has a beginning and an end, it begins with a purpose, conscious, subconscious, or unconscious, and ends with an adjustment. The psychic process begins as a sensation, and its complete cycle runs its course as an idea and then ends in a volition to act. The stimulus marking the beginning of the psychic process and the act marking the end of the process are physical links of a continuous physical process, the links of which can be traced endlessly in physical terms.

Taking the psychic process from the ontogenetic standpoint, we find again the same thing. If the psychic life of the individual is taken as a whole and traced backward, in the past, we arrive at some point, when the stream of consciousness begins, and on following it forward, we finally arrive at a point where the stream of consciousness ends. If we view the question phylogenetically, we come once more to the same conclusion. In the history of biological evolution there was a time when psychic life began, and there will come a time when all psychic life will disappear from our globe. The principle of continuity, the warp and woof of physical science, cannot be worked in psychology, instead of it we can only discover a principle of finiteness and finality.

In a physical process any link taken at random must have a physical antecedent and consequent; not so is it in a psychic process, not each link of the series has its psychic antecedent and consequent, the first link has no antecedent and the last one has no consequent. The phenomena of sleep, of hypnosis, of amnesia, of unconsciousness, of syncope show that the psychic process may be cut short anywhere in its course, and may resume its flow from any given link or stage. The links that go to form the psychic process hang loosely, and any link may really be without an antecedent or without a consequent.

In many cases the seemingly lost antecedent can still be found in the subconscious, dissociated from the active stream of consciousness constituting for the time being the conscious personality or the self-consciousness of the subject, such for instance is the case in the many forms of functional psychopathic diseases and also in hypnosis. In other cases, such for instance, as unconsciousness of epilepsy, the stream of consciousness is interrupted and resumed only after a certain period of time, not even the subconscious can supply us the missing link. In normal sleep we meet once more with an interruption of the current of consciousness, and it is only under certain conditions, such as dreaming, that the subconscious can supply the missing states. Each psychic process is like the life process of a given individual, it has a definite beginning and a definite end; while a physical process has neither beginning nor end, and can be followed out endlessly in the direction of the line of antecedents or consequents. In other words while a physical process is *infinite,* a psychic process is *finite.*

Let P be a physical process and p represent a link in that process, then p^{1}, p^{11}, p^{111}, etc., may be represented as its consequents, while p_1, p_2, p_3, p_4, etc., may be represented as its antecedents. P therefore may be represented by the following infinite series:

$$P = \ldots\ldots + p_4 + p_3 + p_2 + p_1 + \underline{(p)} + p^{1} + p^{11} + p^{111} + p^{1111} + \ldots\ldots$$

The series is infinite in both directions, in direction of p_1 antecedents, and in the direction of p^{1} consequents.

Let S represent a psychic process, *s* a link in that process, s^{1} s^{11} s^{111} s^{1111} etc., its consequents and s_1, s_2, s_3, s_4, etc., its antecedents, then the psychic process can be represented by the following series;

$$S=\ldots\ldots+s_4+s_3+s_2+s_1+\ \underset{-}{(s)}\ \times s^{1}+s^{11}+s^{111}+s^{1111}+\ldots\ldots$$

Now this series is finite, it begins at some link and ends with some link, neither the beginning nor the end is defined,—the series may begin at any link and end at any link. Since the process may begin anywhere in the series, there is really no necessary connection between the links of the series. In the physical process on the contrary, the series is infinite, and any link has a determinate necessarily given preceding and succeeding link. In other words, while the links of the physical process are necessarily causally connected, the links of the psychic process have no *causal necessity*.

Since the two processes, the physical and the psychic are postulated to run parallel to each other, their co-ordination may be represented in the following series:

$$\begin{array}{ll} S\ldots\ldots & \quad +s_3+s_2+s_1+(s)+s^{1}+s^{11}+\ldots\ldots \\ \| & \rule{9cm}{0.4pt} \\ P\ldots\ldots & +p_4+p_3+p_2+p_1+(p)+p^{1}+p^{11}+p^{111}+p^{1111}+\ldots\ldots \end{array}$$

Each link of the psychic process has some link of the physical process as its concomitant.

$$s \text{ has } p,\ s_1,\text{—}p_1,\ s_2\text{—}p^{2},\ s^{1}\text{—}p^{1},\ s^{11}\text{—}p^{11}.$$

The psychic process not having its links causally connected, the causal necessity can only be followed along its concomitant physical or physiological series. Hence we can see why the physiological series is indispensable to the psychic series.

The finiteness of the psychic process makes it impossible to apply to it the principle of necessity. For while a physical process must necessarily have a physical antecedent and physical consequent, a psychic process and each link of it does not *necessarily* have an antecedent or consequent, it may begin and end at any link.

It is only by means of the physical or physiological series that the principles of continuity and necessary causal connection, the foundation of all objective science, can be worked in psychology. Without the help of the concomitant physiological series the investigator of the psychic process is, scientifically considered, completely helpless, since the psychic process has no objectively necessary causal interconnection.

The "Voluntaristic" school in attempting to make of psychology a science independent of all physiology is fundamentally wrong. Without the physiological series psychology has no cement to fasten its material with, it has no foundation to build on. Psychology can maintain itself in the work of objective natural sciences only on condition of its intimate interdependence with physiology. *No psychology without physiology.* The psycho-physiological hypothesis is both inductively and deductively the *sine qua non* of the science of psychology.

CHAPTER XIV

LIFE AND THE PSYCHIC PROCESS

WE have pointed out that the psychic process is essentially finite and final, can we find any other process that should be characterized by the same mark of finiteness and finality? We find an analogous process in life. The life process is one that has the aspect of finiteness. Ontogenetically, the life-process of an organism has its beginning in the fertilization or stimulation to life-activity of the ovum, and has its end in death. Phylogenetically, the life process runs a determinate course. There was a time when geological conditions did not permit the presence of life, and there will come a time when life will be extinct. Ontogenetically, the biological process is analogous to the mental process. The biological process, unlike the physical process, is not endless; it has a definite beginning and end. Taking any stage of the process as the starting point, we find that neither the chain of antecedents, nor that of consequents can be followed endlessly. Being a finite process we find in it the same relation we discovered in the psychic process,—the first term of the series has no antecedent and the last one has no consequent. Furthermore, the biological process, like the psychological one, may be cut short at any stage,—the organism or the protoplasm may die or be killed. It is only mechanically regarded that the biological process can be worked into the definite texture of physical series.

The finiteness of the life process is especially manifested from the point of finality. In examining the character of living beings, in contradistinction to physical things, we find a fundamental difference between the two. The structure and function of living beings can be regarded under the concept of purpose or that of final causation, the purpose being the good, the advantage, the utility of the organism. Inanimate things cannot be regarded under the concept of final causation, but under that of efficient causation. The stone lying yonder has no purpose, it has no special advantage for its material particles from its particular position. The inner relations of its parts and the relations of its surface-angles and prominences are not of any ultimate good to the stone, nor do we ask of what use is this particular vibration to the molecules. We do ask, however, this question of utility in regard to organisms. Of what use is the grazing or drinking to the cow? Of what use is this particular organ and its function to this or that organism? The problem of utility is one that can only be raised in the case of organic life, but not in the case of inorganic things. We can see the reason why it should be so. Life may be regarded as an adaptation of inner and outer relations. Adaptation and fitness are important criteria with biological processes. What is the fitness, or utility of organs and their functions to the particular organism, and how have they come to this given state of fitness? These problems cannot be ignored by biology as a science. The whole of the Darwinian theory aims to give the key to the way the different forms of adaptations have come about. Adaptation and utility, however, mean aims. A biological process is not an endless series of antecedents and consequents, but one that has an end. A life process is a final process taking place in the organism in its internal and essential adjustments.

The finality of the life process is clearly brought out, if looked at from a totally different point of view. The most characteristic feature of a living organism, is its being an organic whole, a unity, an individuality. All the parts of the organism bear relation to and have their significance with regard to the organism as a whole. The fin of the fish, the wing of the bird, and the arm of the man cease to be what they are, if separated from the particular individual to which they respectively belong. The structure and function of the part can be understood only in relation to the needs of the organic whole. The parts of the individual subserve the organic unity. In the course of evolution, both ontogenetic and phylogenetic, parts may arise or drop out for the benefit and advantage of the whole. Mechanically considered, an organism is nothing but a heap of vibrating molecules or atoms; biologically regarded, *this heap constitutes a whole, an individual,* and each vibration is for the good of this whole, if the individual is to maintain itself in existence.

It may be objected that a machine, though purely mechanical, may be similarly defined. A machine constitues a whole, a unity, and every part bears a definite relation to the whole, and cannot in fact be understood without the knowledge of the machine as a whole. Who, without knowing a watch as a whole, could have guessed the function of a particular wheel or spring, if shown by itself? Each part within a mechanism has its distinctive character only in relation to the other parts forming an interrelated system. Should this be granted, in what sense, then, it may be asked, does an organism differ from a mechanism? Must not then a biological process be, after all, reduced to mechanical terms; and if this be so, is not rather the opposite statement the correct one, namely, that a biological process does not really differ from a physical process? This, however, is not so. The difference between the two is a fundamental one. The unity of the mechanism does not lie in the machine *per se,* but in the needs and mind of the mechanician, while the organic unity is postulated as being in the organism itself. The purpose of the machine does not lie in the machine itself, but in needs outside itself; no machine exists, for its own advantage and good, from its very nature a machine is *for* something else.

An organism, on the contrary, constitutes its own purpose. No organism in nature, not as yet modified by artificial selection, exists entirely for the good of another. The structure and functions of the parts of an organism are for the good and advantage of that particular individual. *Unlike a machine, the purpose falls not outside, but inside the organism.* An organism forms a closed circle, a microcosm, to which the macrocosm is made subservient. Each organism is a centre from which rays radiate to all the points of the universe; in other words, an organism is an end for which everything else is nothing but a means. Darwin was so much impressed with this teleological aspect of organic life that he frankly admitted that, if only one example in a natural state could be produced, an example of an organism showing structure and function useful not to itself, but to another organism, his whole theory of evolution would fall to the ground. *A mechanism is a means, never an end; an organism is an end,* *never a means.*

A biological process is *finite,* it has a definite beginning and end; it is also *final,* inasmuch as it is supposed to be of some use to the organism in which the process takes place. This does not mean, however, that the biological process cannot be looked at from a purely mechanical standpoint. Every object, every external objective process can be looked at from the point of view of pure mechanism, where the series of antecedents and consequents is infinite, where only atoms and their movements have supreme sway; but while some objects and processes admit only of this standpoint, others admit also of another point of view, namely the teleological in which the leading principles are unity, synthesis, and purpose.

Biological processes certainly admit of mechanical treatment, they can be worked into the infinite series of mechanical causes and effect, but, then, these processes so regarded, are simply mechanical and cease to be biological. Life is regarded under a teleological aspect. Science need not necessarily be entirely mechanical, it may also deal with purposes, not self-conscious, not even conscious, but still with purposes, which on account of their not being conscious are to be treated according to the principle of efficient causation. Such is the method of Darwin, in opposition to that of Lamarck. The purposive life processes are treated by Darwin on the principle of efficient causation.

They who want to reduce biology to mechanism should reflect on the meaning of evolution. From a mechanical standpoint, evolution,—the basis of biology, is meaningless. Molecules, atoms and their vibrations can have neither lower nor higher stages, they are all on the same plane, following the same laws from all eternity.

If from our long digression on the nature of the biological process, we now return to the subject under discussion, namely, the psychological process, we can realize clearly the point of view from which psychic life should be regarded. The psychic process is primarily a life process.

Since the life-process is regarded under a teleological aspect, it follows that the psychic process should be treated in the same way. The psychic process is the highest stage in the evolution of life, and as such should be studied not by the instruments of mechanics and chemistry, but by the methods of biology. In addition to the concept of efficient causation, psychology even more than biology, should also work with the concepts of unity, synthesis, and purpose.

CHAPTER XV

THE CHANCE ASPECT OF LIFE AND MIND

THE teleology of the biological process should, however, be somewhat limited. We are apt to overestimate the utility of organs and functions in the world of living beings. There may be organs which are of no use to the organism, and there may be functions which are indifferent and even positively harmful to life. It is questionable whether the thymus gland, the tonsils, the appendix are of any use to man, and it is quite certain that a number of physiological processes take place in the organism which are indifferent and even detrimental to the life existence of the individual.

"In every organism" says Morgan, "there are parts of the body whose processes cannot be of vital importance to the individual. The rudimentary organs, so called, furnish many examples of structures whose presence may be of little or of no use to the individual; in fact as in the case of the appendix of man the organs may be a source of great danger to the individual. . . . Another example of the same thing is found in the rudimentary eyes of animals living in the dark, such as the mole and several cave animals, fishes, amphibia, and insects. There are still other organs which cannot be looked upon as rudimentary, yet whose presence can scarcely be considered as essential to the life of the individual. For instance, the electric organs in some of the rays and fish can hardly protect the animal from enemies, even when as highly developed as in the torpedo; and we do not know of any other essential service they can perform. Whether the same may also be said of the phosphorescent organs of many animals is perhaps open in some cases to doubt, but there can be little question that the light produced by most of the small marine organisms, such as noctilica, jellyfish, ctenophores, copepods, pyrosoma, etc., cannot be of use to these animals in protecting them from attack. In the case of certain bacteria it seems quite evident that the production of light can be of no use as such to them. The production of light may be only a sort of by-product of changes going on in the organism, and has no relation to outside conditions. In certain cases, as in the glowworm, it has been supposed that the display may serve to bring the sexes together; but since the phosphorescent organs are also present in the larval stages of the glowworm, and since even the egg itself is said to be phosphorescent, it is improbable, in these stages at least, that the presence of the light is of service to the organism.

While it is difficult to show that the wonderful patterns and magnificent coloration of many of the larger animals are not of service to the animal, however sceptical we may be on the subject, yet in the case of many microscopic forms that are equally brilliantly colored there can be little doubt that the coloration can be of no special service to them. We also see in other cases that the presence of color need not be connected with any use that it bears as such to the animal. For instance, the beautiful colors on the inside of the shells of many marine snails and of bivalve mollusks, can be of no use to the animal that makes the shell, because as long as the animal is alive this color cannot be seen from the outside. . . . The splendid coloring of the leaves in autumn is certainly of no service to the organism.

As an example of a change in the organism that is of no use to it may be cited the case of the turning white of the hair in old age in man and in several other mammals. The absorption of bone at the angle of the chin in man is another case of a change of no immediate use to the individual. We also find in many other changes that accompany old age, processes going on that are of no use to the organism, and which may in the end be the cause of its death."

We cannot help agreeing with Morgan that the teleology of the biological process is not always evident. A number of processes in the world of life are indifferent, useless, and even detrimental to the life existence of the organism. All the biological processes that lead to the decline of the organism are certainly not useful to the individual; neither are all the processes of a pathological character to which organisms are often subjected in their relations with and adaptation to the external environment. There is certainly no more flimsy, more superficial, and more specious reasoning than the one that ascribes a meaning, utility, and purpose to every organ, function, and physiological process found in the organism. The teleological speculations are often a matter of ingenious casuistry.

The evolutionist who works with the teleological concept of utility must assume spontaneous variation as an important factor in the development of life. In other words, out of a great number of many variations, harmful, indifferent, and useful, the ones that are useful in their adaptation to the external environment survive or are selected by the process of natural selection. This clearly requires the presence of a great number of variations which show no adaptations and therefore are not useful. The utility and adaptation manifested by the biological processes are due to the presence of an immense number of variations of biological processes which are useless, indifferent, and even harmful.

The struggle for existence with its survival of the fittest and the principle of spontaneous variations clearly indicate the presence of biological processes which are essentially purposeless. The theory of evolution, at least from a Darwinian standpoint, the most scientific of evolutionary hypotheses, is based on the empirical assumption that the unadapted variations far exceed in number the adapted or useful variations. Useful purposive biological processes are rare, few, and accidental, while the indifferent, the useless and the purposeless biological processes are by far the most common. The purposive processes are the accidental and the exceptional, while the purposeless processes are the rule. It is out of the purposeless that the purposive processes develop. The fully developed biological process, the fully developed organism is purposeful, because of its selection of the purposeful out of the great mass of purposeless biological processes and unadapted organisms.

In the psychological process a similar state prevails. The general outcome may have purpose, but this is accomplished at the expense of a great number of processes which are accidental, meaningless, and purposeless. The sensations, feelings, emotions, and ideas that arise in our consciousness are spontaneous or accidental variations. They are the raw material for the guiding selective consciousness. Many of the psychic states as they arise in consciousness are rejected by the selective action of attention and are left to die a natural death as are the rejected variations by the process of natural selection. Man would have been a raving maniac, if he were to give expression to the various ideas that spring up spontaneously in his mind. The great number of ideas that throng in the antechamber of consciousness are in themselves purposeless. As Galton well puts it "Although the brain is able to do very fair work fluently in an automatic way, and though it will of its own accord, strike out sudden and happy ideas, it is questionable if it is capable of working thoroughly and profoundly without past or present effort. The character of this effort seems to me chiefly to lie in bringing the contents of the antechamber more nearly within the ken of consciousness, which then takes comprehensive note of all its contents, and compels the logical faculty to test them *seriatim* before selecting the fittest for a summons to the presence chamber." In another place he justly remarks: "The thronging of the antechamber is, I am convinced, beyond my control; if not, if the ideas do not come, I cannot create them nor compel them to come." It is certainly true we cannot call on our ideas to come at our bidding. They come and go unasked.

Mental activity in its rational aspects whether it be logical, moral, or aesthetic, is essentially selective in character. The logical process can draw only definite conclusions from given premises, the moral man or the ethical thinker can only regard definite relations and behavior as right or wrong, and the man who creates and enjoys the beautiful can only regard certain definite combinations as beautiful. Even in ordinary life where the process of selection is not so rigid as in the arts, sciences, and philosophy, still the process of attention to maintain rationality is a severe judge in the rejection of the unfit ideas. In a train of ideas few ideas that offer themselves are accepted as fit and utilized by the guiding thought. The stream of consciousness as it rushes along picks up objects that are intended for and help to reach the destination set out. Every idea, every thought as it presents itself to the guiding process is selected with respect to the purpose of the given stream of thought.

The thoughts that present themselves at any one moment are meaningless and purposeless, they are simply the accidental chance material which the given momentary, purposive thought selects as fit in order to succeed best in the achievement of its purpose. The ideas themselves as they present themselves are meaningless, purposeless, chance creations of the brain, like the phenomena of accidental variation. When the selective process of attention is rigid, more of the chance comers are rejected as not adapted for the purpose, more of the ideas rising to the antechamber of consciousness from the subconscious regions are found to be purposeless. A Kepler rejects a number of generalizations before he finds the formulae of his laws that answer his purpose in the co-ordination of his facts.

At the same time different minds, like different animals, differ in the spontaneous or accidental variations to which they can give rise. The dull mind has but few such variations, while the man of genius, like the endowed animal, has a mass of accidental variations from which to select in the adaptation to the purpose of the thought. The man of genius whether as artist or thinker requires a mass of accidental variations to select from and a rigidly selective process of attention. A great wealth of chance variation of thoughts to select from is the special endowment of the man of genius.

When the process of attention relaxes in the rigidity of its selective activity, more chance images and accidental variations of thoughts are presented to and accepted by consciousness; the selective thought does not hold on to its purpose, the stream of thought becomes constituted of relatively purposeless chance images and accidental ideas. Such states occur in day-reveries or under the influence of alcohol and various toxins as well as in the hypnoidal, hypnagogic, and hypnopagogic states. When the process of attention becomes completely relaxed as in sleep, fever, or in the acute forms of mental maladies, the chance images and accidental variations of ideas come and go without aim and purpose. Purposeless thought is as much the rule of mental life as purposeless accidental variations are the rule of organic life. Like the fully developed biological process, the fully developed mental state presents purpose in its selective activity. Purpose, however, arises out of chaos, out of chance variations. Our dreams, our unintentional errors in speech, writing and action are due to the many chance thoughts which either intrude themselves on consciousness in spite of the selective rigid process of attention, or are due to the momentary relaxation of the selective process. Chance-thoughts, meaningless images and ideas, like accidental variations, form one of the most important factors in the evolution of purposive mental activity.

The so-called "psycho-analytic science" is erroneous, not only because of its fallacious "psychic causation," but also because it is based on the fallacy of regarding each and every mental state as purposive in character. This pseudo-psychology misses the fundamental fact that many psychic occurrences are like many biological occurrences, mere *chance variations*. These chance variations form the matrix out of which the purposive psychic process arises. *Not purpose, but chance is at the heart of mental life.*

CHAPTER XVI

ACTIVITY OF MENTAL LIFE

THE popular mind regards cause as a straining agency which acts in agony of labor on resisting material, finally fashioning it and giving rise to the effect; such a relation is considered as constituting the very essence of activity. This anthropomorphic or animistic view of cause and effect must be rejected by the scientist. The cause does not beget the effect in labor, in strain. To conceive causes as straining agencies is due to the fact that the popular mind has a tendency to mythological creations, to regard natural phenomena as products fashioned by living agencies. The common-sense man in fashioning his material works with his muscles and experiences muscular sensation of strain, of push and pull, hence in regarding the changes in the course of natural processes, he projects into them his subjective muscular experiences. Science, however, has succeeded in freeing itself from all animism, and does not invoke the will and labor of deities and spirits as the causes of physical phenomena, nor does it regard causes themselves as little deities and sprites with will and strain in the production of effects.

Objectively regarded, what nature presents is only sequences of events, or phenomena, and the only relationship observed between cause and effect is simply one of *invariable sequence*. If of two phenomena one antecedent and the other consequent, the consequent is invariably observed to depend in its variation on the antecedent, such an antecedent is declared to be the cause of the consequent. To give an illustration. If a stone falls from a certain height on a heap of many layers of thin glass, the stone in falling breaks the glass. We declare the stone to be the cause of the breaking of the glass, why? Because we observe the fall of the stone, and on reproducing the same conditions, the same results follow; fall of stone, then breaking of glass. Furthermore, increasing the weight of the stone, more layers of glass are broken, on decreasing the weight of the stone less layers are broken, variations in the consequent depend on the variations of the antecedent. We may similarly change the distance from which the stone falls, and the effect will vary once more. On changing the material of the stone the amount of breakage will vary once more. Furthermore, on changing the consistency of the glass layer the effect will again vary. In short, where the phenomena are observed to stand to each other in functional relation of invariable sequence, the antecedent is declared to be the cause of the consequent, such, as in our example, the fall of the stone is regarded as the cause of the breaking of the glass. What is observed is simply an invariable sequence, so much stone momentum, so much glass breakage. No strain or enforcement are ever observed between causes and effects. No strain is observed in the falling stone to produce the effect, nor is it ever detected that the glass resists and is forced into the broken state by the power of the stone.

Strain, resistance, enforcement, power, are all states drawn from experiences of our psychic life. As Mach puts it: "There is but one sort of constancy which embraces all forms of constancy, constancy of connection (or of relation). The majority of the propositions of natural science express such constancies of connection: 'The tadpole is metamorphosed into a frog; chlorate of sodium makes its appearance in the form of cubes. Rays of light are retilinear. Bodies fall with an acceleration of 9.81.' When these constancies are expressed in concepts we call them laws. Force (in the mechanical significance) is likewise merely a constancy of connections. When I say that a body *A* exerts a force on a body B, I mean that B, on coming into contraposition with A, is immediately affected by a certain acceleration with respect to A. The singular illusion that the substance A is the *absolutely constant vehicle of a force* which takes effect immediately on B's being contraposed to A is easily shaken. . . . The phrases, 'No matter without force, no force without matter,' which are all but abortive attempts to remove a self incurred contradiction, become superfluous on our recognizing only constancies of connection."

Similarly Karl Pearson regards the scientific law "as a brief description in mental short hand of as wide a range as possible of the sequences of our sense-impressions" or experiences. "If the stone from my hand break a window, the cause of the broken window might very likely be spoken of as the moving stone. But although this usage is an approach to the scientific usage of the word cause, it yet involves in the popular estimation an idea of enforcement which is not in the latter. That the stone moving with a certain speed *must* bring about the destruction of the window is, I think, the idea involved in thus speaking of the moving stone as the cause of the breakage. But were our perceptive organs sufficiently powerful, science conceives that we should see before the impact particles of window and particles of stone moving in a certain manner, and after the impact the same particles moving in a very different manner. We might carefully *describe* these motions, but we should be unable to say why one stage would follow another, just as we can describe *how* a stone falls to the earth, but not say *why* it does. Thus scientifically the idea of *necessity* in the stages of the sequence—stone in motion, broken window—or the idea of enforcement would disappear; we should have a routine of experience. When we speak however of the stage of a sequence in ordinary life as causes, I do not think it is because we are approaching the scientific standpoint, but I fear it arises from our associating, through long usage the idea of *force* with the stone. . . . Force as cause of motion is exactly on the same footing as a tree god as cause of growth—both are but names to hide our ignorance of the *why* in the routine of our perceptions. The necessity in a law of nature has not the logical *must* of a geometrical theorem, nor the categorical *must* of a human law-giver; it is merely our experience of a routine whose stages have neither logical nor volitional order. In what we have termed secondary causes (successive stages of the sequence) science finds no element of enforcement, solely the routine of experience."

Within certain limits the psychic process, like the physical process, may be regarded as an activity, as a series of phenomena, as a sequence of antecedents and consequents, or as Pearson puts it, as a routine of experience. This activity of course should not be regarded as a metaphysical agency in the sense of a supersensuous soul, but as a successive series of psychic events. From a scientific standpoint the physical process is regarded as a series of successive physical events. Similarly the psychic process may be regarded as a series of successive states consisting of psychic elements, presentative and representative.

Final, and finite as the psychic process is, it has a series of antecedents and consequents. In so far as these can be traced, one can keep within the bounds of the psychic process only. Furthermore, in so far as the series of psychic antecedents and consequents persists we are fully justified in speaking of the whole series as a process, a form of activity, in short as mental activity.

If by activity is understood the sequence of antecedents and consequents, the position taken by some psychologists in declaring the mental stream as inactive is unacceptable. There is activity in the psychic process, if by activity is meant not the popular belief in actual bonds between cause and effect, but mere sequence of antecedents and consequents. The only difference we can find between them is the finality and finiteness as well as lack of invariable or necessary sequence of antecedents and consequents characteristic of the psychic process in contradistinction to the infinite series and *invariable, necessary, or causal sequence,* presented by the physical process.

CHAPTER XVII

THE POSTULATES OF PSYCHOLOGY

WITH all other sciences psychology must postulate the existence of an external material world of space, time, and objects. Psychology does not inquire into the nature of these objects, as to what they are in themselves. This as we pointed out is the business of metaphysics, not of science. Psychology however does ask how we come to know the outside world; it inquires as to the process by which external reality comes to be presented in consciousness.

The fact that psychology postulates an external material world and studies it in so far as it comes to be reflected in consciousness, points to another postulate which psychology must assume in addition, namely, the existence of an inner world consciousness. This postulate is peculiar to psychology, no other of the descriptive and objective sciences have to assume it. Although it is quite clear that without mind there can possibly be no study, no science, still this is but an indirect reflection which none of the concrete sciences have to take into consideration. Of course, a chemist is required for chemistry, a physicist for physics, a physiologist for physiology, and so on, but the chemist, the physicist, the physiologist do not introduce themselves into their science. In all concrete sciences the mind is entirely projected into its object, it is the external object itself that has to be taken into consideration. In concrete science consciousness is drowned in the object, in psychology, on the contrary, the object is drowned in consciousness. The chemist, the physicist, who will turn his attention to consciousness and introduce his psychic states, his moods, dispositions, and intentions as elements into his investigations will hardly be an exact scientist. Not so with the psychologist, he must take the inner world into account, he must deal with consciousness, with moods, with feelings. It is true that he must treat them as objects, but these objects, unlike those of other positive sciences, are after all of the inner subjective world of consciousness. For the very essence of psychology is the taking account of phenomena of consciousness.

In our last statement that psychology deals with the objective external world as reflected in consciousness another postulate is implied. Besides the external and internal worlds, psychology also postulates the *interrelation* of the two.

This interrelation is not direct, it is not one of antecedent, and consequent, but that of coexistence; for as we have already pointed out, the two series of phenomena, the mental and the physiological, must be assumed as concomitant, as running parallel to each other. If, however, by "the external world" we understand the universe of objects exclusive of the functioning psycho-physiological processes then we may say that it stands to the phenomena of consciousness in relation both of sequence and coexistence.

The objective external world enters into relation with consciousness only through the intermediacy of physiological nervous processes. Only on this condition can the external world enter into relation with consciousness, and under special conditions become its direct object. I take a dose of opium, mescal, or cannabis Indica, and have different hallucinations and illusions, mental activity is stimulated. The mind teems with sensations, images, ideas, feelings, emotions, moods; now the whole organism is pierced by sharp pain, now it tingles with indescribable acute pleasure; now a charming vision appears, a beautiful scenery unrolls before the mind's eye, a feeling of perfect heavenly bliss diffuses itself all over our conscious being; now a disgusting, ugly figure presents itself, a horrible scene is witnessed that plunges the mind into an abyss of misery. The current of consciousness is accelerated and it drives its waves with more vigor than ever.

Instead of being accelerated, the current may be depressed and retarded even to such a degree as to plunge the mind into a deep sleep. Such retardation we find under the influence of bromides, or of anaesthetics, such as ether, chloroform, of hypnotics, such as sulfonal, chloral and others. We have here the action of a drug, of an external object on the physiological nervous processes with their psychic concomitants. In this case, however, the drug itself does not become the direct object of consciousness. Through the mere absorption of opium, cannabis or belladonna, we can know nothing of their constitution, we can know nothing of their color, of their size, of their weight, specific gravity and so on, we cannot possibly perceive them as objects. The states of consciousness which cannabis, for instance, gives rise to affords no knowledge of the external objective nature of the drug itself.

A direct knowledge of an external object is acquired through the special senses. Yonder is an object, an inkstand. It stimulates the peripheral sense organ, the eye, the retina, the physiological processes aroused in the rods and cones are transmitted by the optic nerve and by the optic tracts to the visual centres of the occipital lobes, the functioning of which is accompanied by sensations of sight. The wave of stimulation spreads from the visual centres to other centres closely associated with them. They too begin to function with more or less intensity, accompanied by images, ideas, thought, which constitute the perception of the inkstand yonder. The combined activity, or function of a whole system of centres gives rise to the percept inkstand along with its psychic fringe, with the stream of consciousness in which it is bathed. We see and know the inkstand.

From a psychological standpoint the mode of action of the inkstand differs radically from that of the opium. The latter may be characterized as psycho-physiological, or even purely physiological, the former may be termed psycho-physical or psychological, perceptual. The one gives rise to perception, to knowledge of the external object, while the other does not. Both, however, agree in this that they can enter into relations with consciousness only through the intermediacy of physiological nervous processes. The two modes of action and their relation to consciousness may be represented by the following diagrams:

I. Psycho-physical or perceptual relation.

II. Psycho-physiological relation.

I

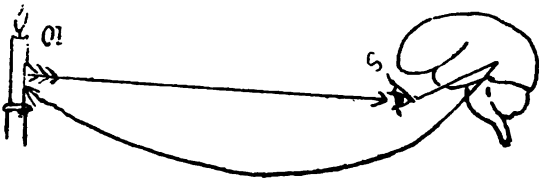

Fig. I

II

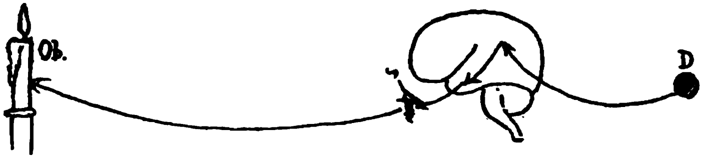

Fig. II

In fig. I, Ob. is the object stimulating S. the organ of special sense, giving rise to physiological nervous processes with their concomitant psychic states constituting the subjective object which is objectified in the object yonder. In Fig. II, D. is the drug acting directly on the nervous centre the stimulated activity of which gives rise to the perception of an external object Ob. Thus we find that external physical and physiological processes are causally related, or stand to each other in relation of invariable or necessary sequence while the physiological and psychic processes stand in relation of *coexistence*. What the nature of this inter-relation is and how it is possible are problems for epistemology and metaphysics. Psychology must assume this inter-relation as its postulate.

If psychology is to be a science at all, it must postulate the uniformity of the phenomena with which it deals. This we have pointed out in our second chapter when we discussed the subject matter of psychology. We turn to it again in order to realize clearly its full meaning in psychology. Psychology, as we know, in addition to the external world of physical sciences, also postulates consciousness. Its postulate of uniformity is, therefore, far more complex than in other positive sciences. With physical science psychology must postulate uniformity of the external world, because it presupposes the physical sciences, and because the external world forms the content and object of consciousness. This, however, is not sufficient. Psychology must also postulate the *uniformity in the inner world of* psycho-physiological, or *mental phenomena.* Were there no uniformity in the phenomena of consciousness, psychology, as a science would have been an impossibility.

This, however, is not all. *Psychology must also postulate the uniformity of relationship between the phenomena of the external and inner worlds. Definite physical processes must be concomitant with certain well defined psychic states.* Were this otherwise, the two series, the mental and the physical, would be out of joint, the relations of coexistence would no longer be obtained, and the two series would stand to each other in no relation at all; thus noise, for instance, would sometimes be smelled, sometimes tasted, and sometimes seen. Psychology as a science that deals with general laws, would certainly have been impossible. We would neither have been able to express to others our states of consciousness in uniform definite movements, nor would it have been possible for others to understand us, nor would it have been possible to call forth in others certain desired states of consciousness; in short, not only psychology would have been an impossibility, but also all human intercourse. The myth of the tower of Babel would have been fully realized. *Psychology must postulate uniformity of interrelation of physical, physiological, and psychic processes.*

CHAPTER XVIII

MENTAL SYNTHESIS

ONE of the fundamental principles of psychology is *mental synthesis*. Objects that appear within the same consciousness are synthetized in a unity, if they are taken cognizance of. An object *a* may be presented to consciousness, and another object *b* may be similarly perceived. They remain two and separate as long as consciousness does not take cognizance of their duality, of their being two objects, but as soon as the two appear in consciousness together and are perceived as two, they are by this very fact synthetized into a unity. This is a point which may not possibly be so clear, and is also hard to realize for those who have been used to work in concrete sciences. The reason is that the mind is accustomed to dwell on the object of thought, not on the function of thought itself, and is therefore used to take the object for the thought. The confusion between the thought that possesses the object, and the object of thought is a fallacy that is as a rule committed by the intelligence trained to busy itself only with external objects. Our reader sees, of course, through this fallacy, he knows that the thing of the idea and the idea of the thing are not identical. The paper on which I write is white and is five inches wide and eight inches long, but my idea of the paper is neither white nor has it so many inches in width and length.

The same fallacy, however, is not so very obvious when it appears under a somewhat different guise. The object of thought has parts, therefore it is concluded that the thought of the object must also be made up of corresponding parts. Because the chain in the external world is made up of so many links, it is concluded that the idea of the chain is made up of so many ideas of links, and that the total sum of the ideas of the links forms the idea of the chain. The idea of the chain, however, is not a mere juxtaposition of so many ideas of links. The ideas of the links would have remained in the juxtaposed disconnected condition, had they not been connected and synthetized in one new idea, the idea of the chain. The word is made up of so many letters, but the sum of the letters is not the idea of the word. The phrase is made up of words, but the mere sum of the words does not make sense, does not form the idea of that sentence.

It is of the utmost importance to fully and clearly realize this principle of mental synthesis. Many a misunderstanding in psychology is cleared up, by keeping this principle clearly before one's mind. We may say that it is one of the principal keys that gives us an entrance into the science of psychology. *A sum of sensations, of ideas, of images, of feelings, etc., at once brought in consciousness as a sum is by this very fact synthetized by thought into a unity.* The chair yonder is composed of many parts, it has four legs, a seat, a back, and each part in its turn is again made up of many parts. Each part, if represented in consciousness at all, has its corresponding idea, but the idea of these component parts, the idea of the chair is a whole, a unity, no longer being a conglomeration of parts. Objectively considered, that man yonder is made up of many parts, of many organs, of many tissues, of millions of cells. To my consciousness, however, he is one, my friend John.

An idea is not made up of parts, as is the object of the idea. Before me lies a grain of wheat, I have a percept of it, I have an idea of that grain. The grain may be divided into halves, or quarters, and I can form an idea of a half, of a third, or of a quarter of a grain. Is it possible to do the same thing with the idea? Can we subdivide the idea of the grain in the same way as we did the grain itself? Can we have a half, a third, a quarter of an idea of the grain? One realizes the impossibility and absurdity of subdividing an idea. We can have an idea of a third of a pound, but it is absurd to talk of a third of an idea of a pound. A third of an idea is simply so much nonsense. But why is it absurd to subdivide an idea? Why is it nonsense to speak of having a half, a third, a quarter or any fraction or part of an idea? Evidently *because an idea is essentially a synthesis, a unity, and has no parts.*

This synthesis, or unity is more or less clear when the percept, or idea is of such a nature as to be synthetized into a numerical unity, and be projected into the external world, such for instance, as the chair, the table, the house, or my friend John. It is, however, far less clear when thought includes many ideas, many percepts and the nature of the synthetized unity is *multiplicity*. There are in my room four chairs. I perceive them as being four. Have I not four percepts, four ideas going to make up my idea of the sum of the chairs? Certainly not. What we have here is not four ideas, but *one* idea of there being four chairs. A sum of ideas is not the same thing as the idea of their sum, just as in algebra the sum of squares is not the same as the square of the sum. I think a sentence "I took a stroll in the forest yesterday morning." The sentence forms a multiplicity of words, but in spite of all that multiplicity, the phrase appears in consciousness as one whole, as a synthetized unity. *Synthetic unity is the essence, the backbone of thought.*

This synthetic unity of consciousness can be made still clearer by the following example. Let the reader imagine a row of men, each thinking one single word of the sentence: "We are standing here in a row." There is here a completely isolated series of ideas, but the words in the series will remain in their full isolation and as such will make no meaning, no one sentence, as long as they will be confined to different disconnected thoughts, and not unified in the synthesis of one synthetic thought or of what I term *moment-consciousness.*

To have the idea of a conglomeration, of a multiplicity of objects, images or ideas, a synthetizing moment consciousness is required, a moment-consciousness that should take cognizance of all these objects, images or ideas and synthetize them into a unity, the one idea of the many. The many words, the many ideas must be synthetized in one moment-consciousness before the idea of the sentence can emerge. This synthesis, in fact, is that one idea. Ideas, images, thoughts, feelings do not come together, fuse into one, and make one idea.

A book is a complex object, it is a conglomeration of pages, letters, words, lines, sentences, paragraphs, chapters. We can have an idea of half a book, but it is certainly absurd to have half an idea of a book.

It means nothing at all; the idea itself has not been formed, and as such, as an idea, is totally absent. A separate synthesis in consciousness is requisite in order to have an aggregation, or association of ideas cognized as one. Ideas do not meet, associate and form a unity, mental synthesis is required. Such a synthesis is always effected, whenever a moment-consciousness gets cognizance of many objects; in other words, sensations, ideas, feelings, images can only get unified in the synthesis of a moment-consciousness. *Mental synthesis of psychic content in the unity of a moment-consciousness is a fundamental principle of psychology.*

It is the great and fundamental error of the associationists to overlook this all important element of synthesis in consciousness. They commit the fallacy of regarding a mechanical combination, or juxtaposition of ideas as making a "fusion," a synthesis, a unity. There is an idea of A, and there is an idea of B, therefore, it is tacitly assumed that there is the idea of A and B. This as we have shown is a fallacy. The associationists regard the idea of a sum as consisting of as many parts, but only "fused," as the sum itself. This is erroneous. The neglect of the element of mental synthesis and the consequent identification of the idea of the sum as a whole with the sum of ideas of the parts going to make up the external sum falsified the otherwise rich researches of the association school. The significance of mental synthesis in the moment-consciousness can hardly be overestimated. We shall return to the theory of the moment-consciousness and its mental synthesis further on.

The question as to the nature of that mental synthesis does not fall within the province of psychology.

Like all other problems that refer to the ultimate nature of things and how they are possible, the problem of the inner nature of mental synthesis does not belong to science, but to epistemology and metaphysics.

CHAPTER XIX

THEORIES OF PERCEPTION

THE theory of perception is fundamental both in normal and abnormal psychology. All mental activities are intimately related with the process of perception. Our wills, our thoughts and our feelings relate to our experience of the outer world of things. Biologically regarded, the percept is of the most vital importance, inasmuch as it forms the medium between the individual and the outer environment. Psychologically, the percept reflects the external world and mirrors the conditions of life to which the given organism has to adjust itself. In fact, the percept may be regarded as the coin possessing the value of the external environment. In this respect we cannot help agreeing with Baldwin's statement: "The theory of perception is perhaps the most important as well as the most difficult problem in psychology. The interpretation of the higher processes of mind rests upon it and it underlies the body of our general philosophy. The great philosophies of the world take their rise from initial differences in the method of construing perception."

In abnormal psychology the theory of perception is of the utmost importance, both from a theoretical and practical standpoint. Illusions, hallucinations, dream states, subconscious states, many states of dissociation depend for their explanation on the analysis of the process of perception. I have developed a theory of perception which may be characterized as *the doctrine of primary and secondary sensory elements.* This doctrine is based on a close analysis of the normal process of perception and is substantiated by observations and experiments of abnormal mental life.

Before however we state our view of perception it may be well to make a review of what the principal psychological authorities teach on the subject.

James Mill in discussing perception tells us: "The colors upon a body are different, according to its figure, its shape, and its size. But the sensations of color and the sensations of extension, of figure, of distance have been so often united, felt in conjunction that the sensations of the color are never experienced without raising the ideas of the extension, the figure, the distance in such intimate union with it, that they not only cannot be separated, but are *actually supposed to be seen* (italics are mine). The sight, as it is called of figure, or distance, appearing, as it does a simple sensation, is in reality a complex state of consciousness, a sequence in which the antecedent, a sensation of color, and the consequent a number of ideas are so closely combined by association that they appear not one idea, but one sensation."

Sully defines perception as a mental act that 'supplements a sense impression by an accompaniment or escort of revived sensations, the whole aggregate of actual and revived sensations being solidified or integrated into the form of a percept.' The revived sensations are equivalent to James Mill's associated ideas and images. We shall point out later the confusion which generally prevails among psychologists and psychiatrists, when they talk indiscriminately of revived sensations and ideas regarding the two as identical.

Höffding describes the process of perception "as the fusing of a reproduction and an actual sensation. The percept is thus conceived as compounded out of a representation and a sensation."

Taine tells us that "Images associated with the sensations of the different senses, especially with those of sight and touch constitute acquired perceptions."

Wundt regards the percept as a psychical compound of ideas or of revived sensations or images. In that respect his analysis differs but little from that of other psychologists who regard the ideas, images, and revived sensations as identical elements going to form the associated whole or psychic compound, the percept.

Külpe speaks of 'centrally excited sensations' regarding them as the ideas and the images of the psychologists and psychiatrists, and tells us that he avoids the use of 'ideas.' As far as perception is concerned he closely follows his master, Wundt, and talks of psychic compounds, of sensations and centrally excited sensations which really are identical with the old ideas and images.

Titchener follows closely Wundt and Külpe, and regards the 'percept as a compound, or a complex of sensations,' of peripheral and of centrally initiated sensations. In order to be explicit he hastens to tell us that there is no fundamental difference between the perception and idea. "It is customary to speak of perception, when the majority of the simple processes in the complex are the result of stimulation of a sense organ, *i. e.*, are peripherally aroused, and of idea when the greater number are the result of an excitation within the brain cortex, *i. e.*, are centrally aroused. If I have a table before me and my eyes open I am said to perceive the table; if I close my eyes and think of what I saw, to have an idea of a table. But we have seen that the sensations aroused centrally do not differ as psychological processes from those aroused peripherally." This statement put in such an explicit form brings out clearly what may be designated as the psychologist's fallacy. The fallacy becomes specially apparent in the domain of abnormal psychology.

Baldwin with his characteristic breadth of comprehension puts the subject of perception on a wide basis: "Perception is the apperceptive or synthetic activity of mind whereby the data of sensation take on the forms of representation in space and time; or it is the process of the construction of our representation of the external world." Baldwin does not commit himself to the ordinary fallacy current among psychologists.

Similarly James with his genius for psychological insight tells us: "The consciousness of particular material things present to sense is nowadays called perception." And again "Perception thus differs from sensation by the consciousness of farther facts associated with the object of the sensation." He tells us further: "We certainly ought not to say what usually is said by psychologists and treat the perception as a sum of distinct psychic entities, the present sensation namely, plus a lot of images from the past, all integrated together in a way impossible to describe. The perception is one state of mind."

We thus see that most of the psychologists regard the percept somewhat in Spencerian terms as being made up of presentations and representations, or as Spencer puts it as being 'partly presentative and partly representative.' In other words, the percept is a compound of sensations and images, a synthesis of peripherally induced sensations and of images, or of ideas centrally excited. One principle underlies the current theory of perception, variously phrased by different psychologists, and that is the identification of ideational and sensory processes.

The identification of ideational and sensory processes may be traced to Spinoza when he tells us in his *Ethics*, Prop. XVII., note, "The modifications of the human body, of which the ideas represent external bodies as present to us, we will call the images of things" and then in another place of Part II., Prop. XLIX., note, "In order to illustrate the point let us suppose a boy imagining a horse and perceiving nothing else. Inasmuch as this imagination involves the existence of the horse, and the boy does not perceive anything which would exclude the existence of the horse he will necessarily regard the horse as present; he will not be able to doubt its existence, although he be not certain thereof. We have daily experiences of such a state of things in dreams." The images, according to Spinoza, are equivalent to sensations and percepts, unless counteracted by the more intense peripheral sensations which thus become the 'reductives' of the image, a doctrine afterwards fully developed by Taine. I may add that Spinoza's view of dreams is repeated almost verbatim by the greatest psychological authorities, all uncritically giving their assent to the current fallacy that the image is but a weakened sensation and that the sensation is an intensified image.

This theory of images and perception is perpetuated through Hobbes, Locke, Hartley, Hume, James Mill down to our times.

Hobbes in his terse English puts it: "Imagination therefore is nothing but decaying sense and is found in men and many other living beings, as well in sleeping as waking."

Locke derives his 'ideas' from 'experience,' but his 'experience' is somewhat vague and broad, inasmuch as it flows from two fountain heads,—sensation and reflection. "Let us then suppose the mind to be as we say white paper void of all characters without any ideas, how comes it to be furnished? . . . To this I answer in one word from experience. . . . Our observation employed either about external sensible objects or about the internal operations of our minds, perceived and reflected on by ourselves is that which supplies our understanding with all the materials of thinking. These two are the fountains of knowledge from whence all the ideas we have or can naturally have, do spring." Perception is used by Locke in a broader sense than what it is understood at present, as he uses perception for sensory experience as well as for the introspection of higher mental processes. He tells us, however, that in either case "the mind has a power to revive perceptions which it has once had, with this additional perception annexed to them that it has had them before." Locke evidently entertains the view that sensations can be revived as original sensory experience and that the revived ideas do not differ, except for the addition of pastness, from the original ideas derived from the great source of sensation.

When we pass to Hartley and Hume the identification of sensation and idea is set forth with great explicitness. In fact, it is taken as the fundamental principle of their psychological systems. Thus Hartley postulates in his eighth proposition that "Sensations by being often repeated leave certain vestiges, types or images of themselves which may be called simple ideas of sensation," and correspondingly we have "sensory vibrations, by being often repeated, beget in the medullary substance of the brain a disposition to diminutive vibrations which may be called vibratiuncles and miniatures corresponding to themselves respectively." The vibratiuncle is the physical substratum of what we experience as an idea, and is a copy of the original vibration. The vibratiuncle is a weakened vibration, and the idea is a weakened sensation.

Hume does not burden himself with Hartley's vibrations and vibratiuncles, but still at the basis of his system we find the same fallacious psychological principle. "All our ideas" he says "are copies of our lively perceptions or impressions." In other words, our sensations are lively impressions, while the ideas are only weakened perceptions,—the idea differs from the sensation only in intensity. There is no qualitative difference between sensation and idea. Ideas belong to sensory processes and do not differ as such from sensations. This view has since become the heritage of current psychological theories.

CHAPTER XX

THE STRUCTURE AND FUNCTION OF THE PERCEPT

AS in many other sciences, especially the ones of the purely mental variety, a good deal in psychology is traditional such for instance are the tripartite and bipartite division of the mind or the various classifications of the mental activities. Of course, classifications as well as theories have their important function in science, but they should not be permitted to become a bed of Procrustes to the guests whom they shelter.

It may sometimes be well to disregard established principles, classifications and time-honored traditions and study the facts from a somewhat different standpoint. We may then possibly see the facts in a new light and realize aspects and connections which are hidden from the customary view of the phenomena.

Suppose we take a mental cross-section of a moment of perceptual consciousness in the very act of formation of a percept. The whole perceptual moment may be said to be spread out before our mental gaze. We find sensory elements of a relatively intense character. Certain sensory elements stand out first and foremost in consciousness, they are the very first to arrest the mental gaze and keep it steadily fixed on themselves. In the same view, however, we can also discern other elements, not so prominent, though equally sensory which, on account of their lack of prominence, appear to be of a subordinate character. The whole tone of the percept is given by the qualitative aspect of the prominent elements which seem to guide and form the organization of the percept.

The general plan of the structure of the percept may be compared to that of the cell. A close examination of the cell reveals the presence of a central element, of a nucleus surrounded by cytoplasm with its meshwork, the cyto-reticulum. The nucleus forms the central and important structure having the functions of assimilation and reproduction. The nucleus and cytoplasm, however, are intimately related; the modification of one affects the other. Both nuclear and cytoplasmic structures form one organized whole, one living cell. Similarly in the percept we find a group of sensory elements which constitute the nucleus, and a mass of other sensory elements, possibly the main mass, forming the tissue of the percept. The nuclear elements are more intense and appear to be predominant in the total mental state, —both however are intimately connected and go to form the living tissue of the percept.

The nuclear elements of the percept have the lead and seem to possess the organizing, the fermenting power to assimilate the mass of subordinate elements and have them transformed into one unified organic whole. The slightest modification in the structure and function of the nuclear elements brings about a change in the total cytoplasmic mass of the percept, giving rise to a different structure, to a different percept; and again, modifications of the cytoplasmic mass, so to say, affect the formation of the nuclear elements often resulting in a different percept. It requires however quite a considerable change in the subordinate elements to bring about a change in the percept; while the slightest modification of the nuclear elements, whether in quality or intensity, often brings about a fundamental transformation of the percept. The nuclear elements may be regarded as the sensitive, as the vital point of the perceptual system. We cannot displace nor can we modify the nucleus of the percept without profoundly modifying or even completely destroying the life existence of the percept.

We may point out here an important aspect of the percept, an aspect which has been neglected by the older psychologists, but which is now being more and more emphasized by the younger psychologists who lay more stress on the functional and biological side of mental life. Like the life of all organized beings, the life existence of the psychic state is for some reaction, for some adjustments to the conditions of the external environment. In the struggle for existence the animal organism must on pain of death be adjusted to the objects of its external world. Now the central, nuclear, sensory elements awakened by external excitations give the cue for the reaction; they form the sensitive organization for the release of motor energy in definite directions; they signify a definite object to which correspond definite motor tendencies with final reactions of adjustment. To the mouse the cat is not an object of contemplation or an object of observation, on account of its sensory effects,—the cat is an object to run away from. To the dog a cat is not an object of beauty, but something to be run after. The sensory stimulations coming from the 'that,' which is mouse, is for the cat something to be on the alert, to jump after and to attack.

The lower we descend in the scale of animal life, the more prominent do the motor reactions become. Where life is predominantly of the instinctive type, the motor side of consciousness is more apparent. The fly attracted by the scent to deposit its eggs in decomposed meat; the wasp that strikes the caterpillar in definite places paralyzing its nervous system, thus preparing food for the coming larva; the newborn infant starting to suck, when put to the breast—are good examples of motor reactions in response to sensory stimulations coming from external objects. A definite sensory stimulus is the trigger which releases a definite set of motor reactions. The fly, the bee is hardly conscious of the sensory characters of the honey; it is more likely that the sensory stimulations of the honey release the appropriate reaction of flying towards it.

The bright colors of flowers developed in the course of natural selection for the fertilization of plants serve the same purpose; they awaken definite responses useful both to plant and insect, as it is hardly probable that the insects are primarily attracted by the beautiful coloring of the flowers. The visual stimuli awakening definite sensory elements may be regarded as central and nuclear which in turn serve as a highly sensitive trigger to release definite systems of motor reactions. The effect is somewhat similar to that of the moth attracted by the flame,—the flame acts as a peripheral stimulus giving rise to sensory elements which form the sensitive trigger in the release of the reaction of circling around the flame, in spite of the harmful results. The moth reacts to bright objects in going towards them, but this particular bright object, the flame, has not been provided for in the motor adjustments of the moth, hence the lack of adaptation, the going to the danger, instead of flying from it.

So apparently insignificant is the sensory side and so predominant is the motor side with its almost mechanically fatal reactions, that some physiologists put the whole mechanism of excitation and reaction in the lower animals under the category of tropisms, which may be positive or negative, according as the animal goes to or from the particular stimulus. The sensory side is denied, the whole affair is regarded as a delicate chemical reaction, such as the chemotaxis of leucocytes in the phenomena of phagocytosis observed in inflammations and bacterial invasions, or what is still simpler as the phenomena of heliotropism observed in the case of plants. This purely mechanical or chemico-physiological view may be crude and far fetched in the case of lower animals, but it brings out strongly the predominance of the motor reaction in response to definite sensory excitations.

The motor attitude of the animal towards the excitations of the external environment constitutes the predominant part of its objective world. The reactions with their sensori-motor effects are part and parcel of the total percept. Sensori-motor life gives reality to the world of objects. The spatial, the resistant, the material character of objects depends on our motor reactions which give content and reality to the world of things. Activity gives the sense of 'physical' reality, the sense of material actuality, or of what is regarded as 'the really real.' In other words, sensori-motor reactions with consequent kinæsthetic sensations may be regarded as constituting the very essence of the real, external, material world,—the world of external, material objects.

The percept as we have pointed out forms one organic whole, the constituent elements are firmly integrated into one living organization. In other words, just as the organism is not simply an integrated compound of cells, tissues and organs, but all those lower units go to form the higher living unit, the life of the organism as a whole, so we may say that the sensory elements are not the same as the percept, they are anatomically found, on the autopsy of the percept,—the sensory elements are the lower units that help to form the higher unit, the living percept. From a scientific standpoint, as the result of psychological dissection, the sensory elements going to make up the psychic compound, the percept, may be regarded as different from the total synthesis with its characteristic living activity and its peculiar form of perceptual consciousness.

The constituent elements of the percept are not of the same definiteness and intensity. The central nuclear elements stand out more distinct, more definite, and consciousness lights them up with more power and intensity. They are like the mountain peaks—when glade and valley and mountain side are still immersed in darkness, the rising sun greets the mountain tops and plays and caresses them with its rays; when again the shades of evening begin to flit and gather over vale, ravine, and gulch, the rays of the setting sun long linger on the peaks taking of them their last farewell. The central nuclear elements are in the focus of consciousness,—they are the first to be met by the glance of the mental eye and are the very last to be left by it. Consciousness plays with its searchlight on the nuclear sensory elements. The central nuclear elements are intense, distinct, and definite, while the subordinate elements are of far less intensity, are often quite indistinct, are, so to say, on the fringe of consciousness; in fact, may even be entirely subconscious. And still indefinite, indistinct, and submerged as those subordinate elements are, they form the main content of the percept, giving it the fullness of reality.

The nuclear elements form the cue of the total reaction, thus standing for the particular object, forming the reality of the percept for the organism. No wonder then that the cue, though it may be the smallest portion of the percept, none the less forms for the organism the most vital, the most significant as well as the most constant part of the percept. The attitude, the total reaction of the organism depends on the slightest difference in the cue, on the slightest change of the nuclear elements, since the apparently slight modification may often prove of great significance to the life existence of the organism,—it may be a matter of life and death. The nuclear elements constitute the signal, the sensitive trigger for the release of definite reactions towards the changes of external objects. Hence the nuclear elements come to signify, in fact, to constitute the essence of the percept.

A change of the subordinate elements of the percept does not matter so much as the slightest modification in the quality or even in the intensity of the signal. This, of course, does not mean that the subordinate sensory elements are not psychologically and biologically of the utmost consequence to the organism, but they are not of that immediate importance as the focal, nuclear elements appear to the consciousness of the organism. The nuclear elements, as signal, focus the interest of the animal. We can well realize their vital importance, if we consider that the nuclear elements are the flag which indicates friend or enemy, war or peace, life or death.

If we regard the percept statically, we may describe it figuratively as a psychic compound, the union of the elements having somewhat the character of a chemical combination. A new compound is formed possessing qualities of its own, different from those of the constituent elements. The sensory characteristics are profoundly modified in the synthesis, so much so that they cannot be directly discerned and can only be discovered by patient study. The elements do not exist freely, they are bound up in one indissoluble union of the percept. It seems, as if different qualitative states arise in the union, the qualities of the elements appearing, as if transformed by the effected synthesis.

The percept forms a new compound in which the component elements are disguised and transformed by the qualitative aspect of the central elements. The subordinate elements become adapted to the active nucleus, and come out in the compound with sensory characteristics foreign to their nature. In the process of synthesis the subordinate elements become transmuted and assume the sensory characteristics of the nucleus. To isolate the various elements out of the synthetized percept, the central elements must be shifted,—the subordinate elements must be made focal, giving rise to new percepts, but at the same time making it possible to pass in review the various elements. In other words, *the elements become revealed in proportion as we make of them signals,* in proportion as they become significant of the total percept with its sensorimotor reactions.

The nuclear elements are the most pronounced, the most prominent, as far as saturation of sensory quality is concerned. They have so much of their peculiar sensory quality that they diffuse it into the other elements,—the subordinate elements appear under the sensory form of the nucleus; they become assimilated by the nucleus, and are saturated with its sensory coloring. This holds true not only in regard to saturation, but also in regard to sensory brightness. The central elements possess a sensory brightness far in excess of other elements, and hence they shed their sensory light on the more obscure, though no less important sensory elements. What however they illumine is not so much the peculiar sensory characteristics of those elements, but their own coloring with which they have saturated the total percept.

The force of the central elements lies specially in the emotional or affective tone with which they are pervaded. They arouse an attitude towards the external world in general and to the special object in particular; Taine would call it a tendency. The individual is stimulated by those nuclear elements; his whole attention is going out in direction to the object that has excited them. The whole organism is invaded by the subtle influence of the nucleus giving rise to definite sensori-motor reactions, intensifying the affective state which permeates the perceptual consciousness.

The affective state of the percept is not always obvious in cases of fleeting percepts, but it becomes manifest, when the central elements become temporarily fixed, the stress and strain of consciousness tending in one direction. The very changes occurring in the flickering intensity of the nuclear elements tend to sharpen the situation, to enliven the interest, strain the attention, and be all agog so to say. The cat getting a glimpse of a mouse, or the dog catching sight of the cat may be taken as good illustrations of the affective states present in perceptual consciousness. The nuclear elements are the ones that are specially charged with affective or emotional states.

Biologically regarded, we can well see the importance of the central nuclear elements, the necessity of their standing out in consciousness as more prominent and more intense than the rest of the sensory elements. Constituting the signal, they come to be the most significant part of the percept, for they announce what 'that' is, they present the object, friend or foe, something to welcome or something to flee from. The central nuclear elements thus come to present objective reality, they safeguard the individual, they are the safety as well as the danger signal. The more delicately differentiated those safety-danger signals are, the more protected the individual is in the struggle for existence. The more sensitive the individual becomes to the least difference of the nuclear elements, the better adjusted will he be to the conditions of the external environment, and the better will be his chances in the process of survival of the fittest.

This brings us to the purposiveness of the percept. One of the important characteristics of the biological process is the final cause, the purpose formed by natural selection out of chance variations, and leading to the preservation of that process, to the preservation of the individual. We should therefore expect that in the psychic process which is the most highly developed biological process, purposiveness, formed out of psychic chance variations, will be one of the most important traits. In the course of phylogenetic and ontogenetic evolution some sensory elements, the ones to which the organism is more sensitive, will be selected and become the indicators of the total percept, they will become the index, or better to say the pain-pleasure flag, the safety-danger signal. The central elements will thus be the most prominent, the most intense for that particular state of perceptual consciousness. The nature and character of the elements will vary with the organization of the species and the individual. The dog will become more sensitive to variations of his olfactory sensations, while man will show marked sensitivity towards delicate differences of his visual sensory elements.

The great sensitivity of the nuclear elements is significant, in so far as they lead to better adaptation and to more successful reactions. It is not of any consequence for the cow to gaze at the stars, for the pig to observe the phases of the moon, but it is a matter of importance for them to perceive any signs of food, or the approach of a beast of prey. The heavenly bodies are non-existent for the brutes, because of lack of all reactions of adaptation, while food and predatory beasts are easily detected, because of the vital reactions bound up in the elements of the percept of which the nuclear elements form the signal. It is on account of the vital reactions that the perceptual nucleus plays such a prominent part and takes the lead of all the other elements. As I have pointed out in a former work: "The psychic state is for some reaction and that sensory element which gives the cue for the formation of the psychomotor elements, leading to some given reaction is, for the time being, the center, the nucleus of the total state."

CHAPTER XXI

PRIMARY AND SECONDARY SENSORY ELEMENTS

IF we inspect the percept more closely, we find that there is some important difference in the character of the various constituent sensory elements. The central elements forming the nucleus of the percept are given *directly* by the sense-organ stimulated by its appropriate sensory stimuli, while the subordinate sensory elements are given *indirectly*,—they cannot be traced to appropriate sensory stimuli exciting those particular sense-organs on the activity of which those subordinate elements depend for their manifestation. In perceiving the lump of ice I can see the color, the size, the volume, the smoothness, the transparency, the distance, and even the weight and coldness. Now what I can see directly is only the color, transparency, size, as given immediately by the stimulated sense-organ, by the visual sensations and image on the retina. Whence then come the rest of the sensory elements so distinctly experienced? They are not memory elements,—they have the same sensory characters as the elements given by the direct impression of the sense-organs. It is not that on perceiving a certain transparent object we *remember* its volume, its distance, its smoothness, its resistance, we *perceive* all that in sensory terms. They are not images, ideas, or representations—they are sensations. The central sensory elements may be termed direct or *primary*, while the subordinate elements may be termed indirect or *secondary*. The percept then may be regarded as consisting of two classes of elements of sensations, the primary and secondary sensory elements.*

The secondary sensory elements are not images, nor ideas, nor representations, different terms employed for the same state by various writers, the *secondary elements of the percept are essentially sensations.* Now sensations are qualitatively different from images, ideas or representations. The image of a light does not shine, the idea of a voice does not sound, and the representation of a perfume does not smell. A sensation, or presentation as it is sometimes termed, differs from an image or representation qualitatively, fundamentally. The sensation or presentation is given as immediate experience, while the image, the representation is essentially mediate, it is a mental substitute for the immediate experience of the sensation. The idea or image bears the same relation to the sensation as a photograph bears to the original, or rather as a symbol to the thing it represents. Ideas, images, representations substitute, represent sensations, but they are not sensations. A sensory process is fundamentally different. A sensation is not an intense idea, nor is an idea a weak sensation. Ideas differ far more qualitatively from sensations than visual sensations, for instance, differ from olfactory sensations. There is not a particle of evidence to substantiate the view that ideas or images are copies of sensations in the sense of being weak sensations or 'centrally excited sensations.' There is nothing of the sensory in the idea. The weakest sensation cannot compare with the most vivid representation.

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*It may be well here to point out that the doctrine of primary and secondary sensory elements advanced by me has nothing in common with the primary and secondary qualities of the older psychologists,

The laboratory experiments on that subject (Münsterberg and Külpe) are inconclusive as they either deal with incompletely perceived impressions, or with minimal sensations. In either case the percept is incomplete and uncertain. Külpe himself is forced to admit that ideas or 'centrally excited sensations' as he terms them "cannot be regarded as simple revivals of peripherally excited contents, if only for the reason, that their remaining attributes are very rarely indeed identical with those of perception." He then goes on making a fatal admission: "The most striking evidence of disparity is perhaps afforded by intensity. . . . It is only in special cases that centrally excited sensations can rise from their accustomed faintness to the vividness of sense perception. We then speak of them as hallucinations (?); and they enter into a disastrous competition with the real material of perception, completely transcending the boundary line which so usefully divides it from the material of imagination." Külpe admits that there is no intensity to the image, that there is no variation in 'intensity' of images, an 'attribute' characteristic of percepts. Psychologically regarded, this in itself shows the qualitative difference between image and percept.

In spite of the fact that Bergson is interested in psychology from a purely metaphysical standpoint, he nevertheless has some excellent remarks on memory and on the qualitative difference between image and percept. Although he is wrong in supposing that the image may be prolonged and projected into perceptual consciousness, he none the less emphasizes strongly the qualitative difference of the two. If I understand him aright he is opposed to the view of identification of memory images with sensations. A memory image is not a weakened sensation. "The absurdity" says Bergson "becomes patent when the argument is inverted (although this ought to be legitimate on the hypothesis adopted), that is to say, when the intensity of the sensation is decreased instead of the intensity of the pure memory being increased. For, if the two states (memory-image and sensation) differ merely in degree, there should be a given moment at which the sensation changed into a memory. If the memory of an acute pain, for instance, is but a weak pain, inversely an intense pain which I feel will end, as it grows less, by being an acute pain remembered. . . . Never will this weak state appear to me to be the memory of a strong state. Memory is something quite different."

Ideational and perceptual processes cannot be identified. The two are qualitatively different: the sensation has intensity, the image lacks it. We may point out the main differences of sensation and image. (*a*) A sensation has intensity, an image totally lacks it. (*b*) An image is a reproduction or rather a representation, a symbol of a sensation, but no sensation represents another; a sensation, unlike an image, is not mediate, but immediate experience. (*c*) A sensation bears the mark of externality, an image lacks it. Finally (*d*) a sensation cannot be called up at will, while an image is independent of peripheral stimulations of external objects and is usually under the control of the will. No sensation differs so much from another as the image differs from its corresponding sensation.

Sensory elements and their synthesis, the percept, have motor tendencies, while the image or idea has not any motor tendencies. The reason why every image and idea has been made ideo-motor is because images or representations have been regarded as sensory in character, as weakened sensations, as 'sensationalettes' so to say. Bergson clearly sees the qualitative difference of the two; he insists on the non-motor character of the image in contradistinction to the strongly motor character of the sensation and the percept. Recently Thorndike laid great stress on the psychological fallacy of regarding images and ideas as motor in character. This fallacy is essentially due to the current identification of presentative and representative elements.

To refer as Külpe does to a hallucination as an intensified image is to reason in a circle and at the same time to be in sad contradiction with facts. A hallucination may be regarded as a fallacious percept, but it is not on that account an image; a hallucination is a percept and is essentially sensory in character. The fact of a percept being fallacious does not in the least imply that it is 'imaginary' and not sensory.

The ambiguity of the word 'imaginary' has not a little contributed to the psychological fallacy helping towards the confusion of image and sensation. 'Imaginary' is used in the common sense meaning not corresponding to any external reality, or in the psychological sense of consisting of those internal events or processes known as images or ideas. Now 'imaginary' used in the sense of lack of an external object by no means implies the psychological sense of consisting of images. A hallucination is commonly said to be imaginary in the sense of not having an objective reality, but we have to prove yet that it consists of images.

The theories of illusions, hallucinations as well as of dream states and hypnotic hallucinations are vitiated by that fundamental psychological fallacy. As a matter of fact hallucinations are not made up of images, but of sensory elements; while on the contrary hypnotic hallucinations are not made up of sensory elements, but of images. Hallucinations are not due to 'images' but to actual sensations. Psychologically regarded, hallucinations do not differ in their make-up from ordinary percepts. Ideas and images are not possessed of magic virtues, and with all the fancy work about them, they cannot display sensory qualities. The image or idea is that bloodless, shadowy, fluttering affair which can no more attain the life of a sensation than a written letter can attain the power of sound. Had it been otherwise the world would have been a large asylum for images to play their pranks in.

We may quote Stout as one of the few psychologists who seem not to accept the current psychological doctrine. In his 'Analytic Psychology' he tells us 'that complex perception does not consist in a given impression reviving a cluster of faint images of previous impressions.' And again "impressional revival does not in the least countenance the theory that ideas are merely faint revivals of impressions. On the contrary, it tends strongly in the opposite direction. It shows that a revived impression is itself an impression, and not an idea." In his 'Manual of Psychology' he says 'that at bottom the distinction between image and percept is based on a difference of quality.' And again, "percepts and images possess a relative independence. This can be accounted for, if we suppose that the nervous tracts excited in perceptual process are not wholly coincident with those excited in ideational process."

The elements of the percept are not ideational, not imaginary, they are essentially sensory. The perceptual elements are synthetized into one percept. To take our stock example, the ice. The lump of ice is experienced as one object with many qualities each of which furnishes respectively its sensory quota towards the formation of the whole of the perceptual experience. We see, we perceive the hard, heavy, smooth, resistant body of ice,—all the elements have alike the intensity of sensation. The hardness, the smoothness, the bodily resistance are perceived by the visual sense and are visual, but as such they, of course, differ from the sensations experienced by their appropriate sense organs, as when for instance the same sensations are given by touch or by muscular and kinæsthetic sensations. Those muscular and tacto-motor sensations appearing as visual are not memory-images, but they are *actual sensations*, they are *secondary* sensations; they are secondary sensory elements which give the fullness of content to the percept, having visual sensory elements as its nucleus. Unlike memory-images, secondary perceptual elements have the immediacy of sensory experience. Remembered sensory qualities are not immediate experiences given in the object of perception.

If we turn to pathology, we find that cases closely confirm our view. In certain mental diseases the patient can perceive the various qualities, although he cannot represent them to himself. In other cases the patient can clearly and vividly represent objects in all their details, but he cannot perceive the objects, when directly confronted with them. Clinical cases, even if we exclude all facts from introspective study, clearly point to the qualitative difference of image and sensation, irrespective of the assumption of localization—they may be due to the function of different brain structures, or to different processes of the same brain structures. In the light of recent research it is more likely that the neuron structures underlying ideational processes differ from those subserving sensory processes. Whichever view however we entertain in regard to the anatomical structures all the facts go to prove that image and sensation are *qualitatively different psychic events*.

The percept is not ideational, but sensory. There are no memory-images in perceptual consciousness, although the latter may be closely associated with ideational processes. Such ideas, however, are on the fringe of the perceptual consciousness and do not constitute the essence of the percept. The percept consists of sensory elements, primary and secondary. The primary elements are initiated directly by incoming peripheral stimulations, while the secondary sensory elements are brought about indirectly, through the mediacy of the primary elements, the secondary elements themselves being really derived from sense-organs *others than the ones directly stimulated by the peripheral excitation*.

If the percept is visual, and V stands for the visual physiological processes, A for the auditory, O for the olfactory, M muscular, K kinæsthetic, T for tactual physiological processes; then let V_1, M_1, O_1, K_1, T_1 stand for the primary sensory elements; and let V_2, O_2, M_2, K_2, T_2 stand for the secondary sensory elements, then the total percept may be represented by the formula $V_1O_2M_2K_2T_2$. Since all the other elements appear in the visual percept under the visual aspect, we may represent the percept by the formula: $V_1 M_2^{v^1} O_2^{v^1} K_2^{v^1} T_2^{v^1}$.

The secondary sensory elements, though forming the main content of the percept, are apparently of a visual nature, and still they really belong to qualitatively different realms of sensations. This clearly reveals their origin and nature: *the secondary sensory elements are not visual, but they become so by being initiated through the visual sense.* In other words, secondary sensory elements are not peripherally initiated. Are they then centrally excited sensations? No. They can only be induced by an external stimulus. But that external stimulus must act *indirectly,* through another sense-organ.

CHAPTER XXII

SECONDARY SENSORY ELEMENTS AND HALLUCINATORY PERCEPTION

IN stimulating a sense-organ we not only get sensory elements characteristic of that particular sense, but also sensory elements belonging to other sense-organs which have not been stimulated. What really takes place is this: the external excitation acting on a particular sense-organ produces its appropriate sensations, but the peripheral physiological process diffuses or rather to say gets irradiated along other neurons of other sense structures, awakening their appropriate sensations. Such sensations, not being directly but indirectly peripherally initiated should be regarded as secondary sensations.

The phenomena of secondary sensations are well known in psychological literature. Some psychologists following the general fallacy of confusing image and sensation describe vivid images succeeding sensations under the category of secondary sensations. Barring such confusion we may say that the pure phenomena of secondary sensations are essentially sensory in character. When a sensation due to the stimulation of a peripheral sense-organ, instead of being followed by a train of association of ideas is followed by another sensation belonging to the domain of another sense-organ, the phenomenon is known as that of synæsthesia or of secondary sensations.

One image or representation relating to a sensation of one sense-organ may be associated and bring in its train of associations any other image relating to any other sensation of any other sense-organ. The series of ideas or images is a reproduction of stimulated sense-organs with their accompanying sensations, the ideas running parallel to the original psycho-physiological processes, somewhat on the Spinozistic principle of '*Ordo et connexio idearum idem est ac ordo et connexio rerum.*' And again in other cases, when not reproducing a previous series of sensory experience, the series of associated images may be more irregular and apparently capricious—a process usually described as the work of fancy, or imagination. A sensation or image then may be followed by any series of images without the intermediacy of external excitations and peripheral physiological processes. A sensation, however, cannot be followed by a series of sensations without the intermediacy of external stimulations. A sensation can only be initiated by its own appropriate stimulus and by its own specialized peripheral physiological processes. The smell of a rose does not by simple association give rise to a series of sensations of touring in an automobile, nor does the eating of beefsteak give rise, through association, to the hearing of a symphony. In other words, *there is an internal association of images or ideas, but there is not an internal association of sensations.* Images once born can be reproduced endlessly and at will, sensations die almost immediately after they are born and must be renewed every time under the same conditions of external stimulations. Briefly stated, there is memory for images, but not for sensations. *Sensations are independent, images are interconnected.*

If we represent sensations by *A, B, C, D* and symbolize images by *a, b, c, d,* the *A, B, C, D* have no relations to one another, but each one bears a definite relation to each corresponding image, *A* to *a, B* to *b, C* to *c, D* to *d,* and so with the rest of the series. Sensation *A* will arouse image *a* which in turn may arouse the whole train of images, *b, c, d,* but *A* cannot give rise to any of the sensations *B, C, D.* The image series *a, b, c, d* can be reproduced at will, in fact after a series of repetition the whole chain of links may rattle off against will, but nothing of the kind occurs in the case of sensations. Sensations do not form links in a chain which becomes automatic after many reproductions. *Repetition of sensations does not form associated series; sensations maintain their independence.*

The difference between image and sensation in respect to association is, psychologically regarded, apparently flawless. Unfortunately as it is usually the case with flawless generalizations and descriptions of phenomena observed under normal conditions, there is an ungracious 'abnormal' that refuses to fall into line. There are cases apparently abnormal from the psychological standpoint, cases which refuse to be gathered into the normal psychological fold; these cases seem to run counter to all normal psychological introspection. The sensations seem to run riot,—instead of being linked with their respective images they really call up *associated* sensations; these are the so-called sound-photisms or light-phonisms, and similar odd combinations. It is true the sensations are rather awkwardly associated. One sensation always calls forth only a particular sensation and no other one, and besides the called forth sensation does not belong qualitatively to the same domain with the one that has initiated it. It is also true that the sensations show their lack of sociable character by not entering into any association with any other sensation, and that, unlike images, no associative series can possibly be formed. Still the fact remains that a sensation can and does call forth another sensation. Evidently sensations can enter into associative bonds.

Such psychic states appear uncanny and are regarded as abnormal. The phenomena are regarded as freaks belonging to the domain of pathology. Now curiously enough our study reveals the fact that what has been regarded as the pathological and exceptional turns out to be the ordinary and the normal. The stone which the builders neglected has become the corner stone. The exception has turned out to be the rule. Far from being the case that secondary sensations are rare and abnormal, they are quite common, since they constitute the very flesh and blood of the percept. *Secondary sensations constitute the texture of the percept.* The reason why they appear so strange is just because they are so common and so familiar.

The secondary sensation, when appearing alone out of its perceptual complex, cannot be recognized as the old familiar attendant belonging to the indissoluble retinue of the humdrum percept. Dissociated from its perceptual sphere the secondary sensation appears ghostly, hallucinatory. As a matter of fact the secondary sensation, hallucinatory and spooky as its manifestations are, constitutes part and parcel of perceptual experience. In fact, *the main content of the percept consists of hallucinatory secondary sensations.* Percepts and hallucinations are of the same grain. A percept is a hallucination with the primary nuclear sensory elements *present,* a hallucination is a 'real' percept with the primary sensory elements *absent*.

When secondary sensory elements become dissociated from the perceptual synthesis with the primary sensory elements, the elements, thus dissociated, not being related to any peripheral physiological process of their appropriate sense-organ, are regarded as central phenomena, as secondary sensations which are described as unusual, abnormal events of mental life. What, however, is abnormal is not the secondary sensation *per se*, but the fact of its *dissociation*. A secondary sensory element dissociated from its perceptual system becomes manifested as a secondary sensation.

Secondary sensations are free secondary sensory elements, dissociated from the perceptual aggregate into the synthetic unity of which they enter as important components forming the organic whole of the percept. When appearing isolated, secondary sensations are the simplest form of hallucinations which become more and more complex as the secondary sensory elements, dissociated from the primary elements, become manifested in complex systems. *Hallucinations are systems of secondary sensations or of secondary sensory elements.*

Sensory elements are, as a rule, not free, they usually appear as perceptual compounds, and this holds specially true of secondary sensory elements. When, therefore, dissociated from their perceptual compounds, they appear as ghosts of the 'real' percept, as hallucinations. To quote from a previous work of mine: "The integration of the groups and especially of the secondary presentative groups is not of that unmodifiable organic character. Around a nucleus formed by a group, or combinations of groups of primary elements, groups of secondary sensory elements become aggregated, and the total aggregate gives rise to a consolidated and unified system of groups, resulting in a percept. In perceiving the chair yonder only the visual sensations constitute the true sensory groups that form the nucleus of the percept. The other psychic groups that are crystallized round the percept, such as weight, resistance, volume, size, shape, distance are really visuo-tacto motor groups; they are largely tacto-muscular groups tinged by the sensory quality of the nucleus; they are tacto-motor groups sensorially visualized, seen indirectly. Though these secondary sensory groups are firmly integrated, still their integration is not of such a character as not to become disintegrated and rearranged into new systems of groups. Such a disintegration is no doubt effected with difficulty, but it is by no means impossible.

Perceptual compounds, unlike sensory, admit of decomposition into elementary primary and secondary sensory groups. The component elementary sensory groups can be experienced separately under different conditions and circumstances. We can close our eyes and walk up to the object of perception, say the chair, and thus experience the free muscular sensations of distance, or we may push our hand against the chair and experience the sensation of resistance, or take the chair in the hand and experience the muscular sensations of weight and shape. The primary and secondary groups going to make up the percept can be isolated by withdrawing the organizing nuclear group of primary sensations, thus bringing about a disintegration of the particular aggregate.

"If we inspect more closely this process of isolation, we find that the constituent secondary sensory groups are not really isolated, so as to stand out all by themselves. What actually happens in this seeming process of isolation is simply the formation of a series of new perceptual aggregates in which the particular sensory groups that are isolated and specially brought out become the nuclei, the foci. For in the perceptual aggregate it is always the character of the nucleus that is specially brought out, and it is the nuclear aggregate that tinges with its sensory color all the other aggregates. To revert to our previous example, to the percept chair. In passing the finger over the chair, the touch may form the nucleus of the moment, but around this primary nuclear sensory group other secondary sensory groups, such as thermal and muscular sensory elements become organized to form the synthesis of the perceptual moment. If we try to find out the shape of the chair by a series of touches, we really form a series of percepts, the sensory nuclei of which are not visual, but tacto-muscular in their nature. A sensory group then cannot in reality appear in a purely isolated form." In other words, sensory elements appear in groups,* and this holds specially true of secondary sensory elements or of secondary sensations. Secondary sensations, though present in every percept, rarely appear in isolation. The affinity of secondary sensory elements to run into compounds becoming synthetized with primary elements makes it difficult to observe them, except in the peculiar phenomena of synæsthesia and in the abnormal states of hallucination.

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*James lays stress on this fact of grouping of sensory elements: "*All brain processes are such as give rise to what we may call Figured Consciousness.* If parts are irradiated at all, they are irradiated in consistent systems and occasion thoughts of definite objects, not mere hodge-podge of elements."

If secondary sensations are simple hallucinations, hallucinations are compound secondary sensations. As we have pointed out a close examination of hallucinations shows them to be systems of secondary sensations dissociated from their primary nuclear elements. In states of dissociation a peripheral stimulation with its physiological process and concomitant primary sensory elements may become dissociated from systems of secondary sensory elements which alone stand out in consciousness as hallucinations. A close examination reveals the presence of some obscure pathological conditions which by irritation and by irradiation awaken secondary sensory elements giving rise to full fledged hallucinations.

In the cases of hallucinations investigated by me I have found pathological processes which gave rise to secondary sensations crystallized into hallucinations. Thus one of my cases suffered from auditory hallucinations. The patient heard voices telling her all kinds of disagreeable things. She complained that the voices came not through the ear, but through a spot located over the Fallopian tubes. An examination of the ear showed nothing abnormal. Physical examination revealed nothing abnormal in any of the other sense organs. The Fallopian tubes, however, were very tender and painful to pressure. The patient suffered from an old chronic salpingitis. The hallucinations, which were of a sexual character, became more severe at regular intervals coinciding with monthly periodicities.

One case of mine suffered from visual hallucinations. He saw spirits, ghosts and visions of saints. When he travelled in a car, he could see little men with benevolent faces, and for some religious reason he regarded them as saints who came to his help. He could see them splitting the rocks and disappearing there, or sometimes the rocks split open and the saintly little men came to the surface. Occasionally apparitions of the dead visited him. The visions were never quiet, but always in motion, they did not stay long and rapidly disappeared, giving rise to new visions. An examination of his special sense-organs showed nothing abnormal. The sense of touch, pressure and kinæsthetic sensibility manifested peculiar abnormalities. The skin of the body was very sensitive and that of the scalp was extremely tender to touch. The patient could not bear any pressure of the scalp and was mostly bareheaded, though he was very sensitive to draughts and to changes of temperature. Occasionally he experienced a sense of formication all over the body, especially in the scalp and in the region of the neck, the muscles of which were extremely sensitive to pressure. Now when the head was inclined to one side or pressed hard or kept in a tense state for a couple of minutes at a stretch, he could see spirits floating in the air, he could see the little men with their saintly faces coming out of the ground and disappearing into it again.

One case of functional psychosis, with epileptoform attacks presenting phenomena of dissociated states with distinct tendencies toward the formation of multiple personality, suffered a good deal from auditory hallucinations. It will take too much space to give an account of the details of the different seizures and of the various dissociated states manifested by the patient. For our present purpose it is enough to refer to the hallucinations. The patient complained that she could hear voices talking to her, her mother and brothers communicating with her from a distance. An examination of the auditory apparatus proved it to be in excellent condition. In this case the phenomena of unconscious phonation were quite well developed, the patient was observed to move her lips and whisper—the whisper becoming sometimes quite loud so that many words which the patient referred to the voices of the mother and brothers were really uttered by the patient. An examination of the eye revealed the presence of an astigmatic condition and a limitation of the field of vision. When the patient was made to count or to read aloud or when absorbed in a conversation, the auditory hallucinations ceased. The auditory hallucinations considerably diminished, both in frequency and intensity, when the astigmatism was corrected by eye glasses.

Similarly in another case the patient suffered from auditory hallucinations. Here the patient was observed talking to himself. This was so pronounced that now and then he himself became conscious of the fact that he was talking to himself. He describes this experience of automatic talk which seems to be uncontrollable and of which he is often unconscious by the term of 'autovocalization.' In this case the patient now and then can catch himself telling things to himself which he takes for the voices of other people as he is then conscious of the hearing, but not of the utterance of the words and phrases. This, however, is not always the case; in fact in a good many cases where unconscious phonation is present, as, for instance, in the case of the patient with the epileptiform seizures described above, the patient is entirely unconscious of the fact of 'whispering.' When attention was drawn to the phenomenon, the whisper and the hallucination disappeared.

Another patient of mine suffers from auditory hallucinations. He hears people abusing him and calling him names. The hallucinations occur when he is awake, but they are frequent when he is on the point of falling asleep, or when he wakes up. He thinks, in fact he hears that people whisper about him. The voices are observed to increase in frequency and intensity with the presence of external noises, such as noises made in the hall, or sounds made by cars passing by. The patient was observed having subconscious or unconscious movements of lips, tongue and even of the jaws. When he hears the voices the subconscious movements increase so that they may be perceived at a distance. Even the nurse could not help perceiving the subconscious whispering made by the patient. When the patient looks through a printed or written page the subconscious whispering increases. The same is observed when the patient is very much interested in something or absorbed in deep thought. During such times he complains that he hears voices. With his mouth wide open and holding his tongue stationary, the unconscious whispering ceases and along with it the auditory hallucinations disappear.

One of my cases, a lady of about sixty, suffered for about fourteen years from auditory and visual hallucinations. She complained that she was surrounded by ghosts of departed family members who did not leave her alone. The spirits talk to her, they give her advice which is often against her interests. Her departed husband and his brother are the chief leaders, the 'guides' so to say. They talk to her on all important occasions and try to guide her in life. The patient resents such interferences. When the voices became insistent she also had visions of the spirits and could hear them talk to her, a proceeding which she always attempted to discourage, but she admitted that the voices and the spirits had the best of her, and she was forced to follow their instructions. An examination of the patient revealed the fact that the hearing on the left side was rather defective, the tympanic membrane was thickened and there was present a chronic pathological process due to a former condition of middle ear disease. Any continuous and prolonged irritation of the diseased ear started the voices, increased their intensity, and caused the manifestations of the visions.

I may also refer to a patient under my care who suffered from auditory hallucinations and thought herself possessed by demons. From her ninth year she suffered at various intervals from those voices which sometimes told her unpleasant things. Along with the hallucinations she also had attacks of automatic speech. Now and then she simply heard voices and was not conscious of any involuntary speech, but occasionally the involuntary utterance took such possession of her that she could not control it. She felt as if some other being got possession of her organs of speech. This frightened her even more than the hallucinations. She kept away from her friends fearing sudden attacks of involuntary speech. It appeared to the patient, as if some other beings made her talk against her will. She shunned society, because the other beings forced her to tell aloud what she thought of the people in whose company she was present. When she was not conscious of the forced speech, she often heard voices which she ascribed to the same demons. There was nothing of the delusion of paranoia in it as she could not account for the involuntary speech and auditory hallucinations. The patient was of Irish descent, uneducated, though very intelligent. The explanation of 'demoniacal possession' was given and maintained by her family in Ireland. She was glad to take my view of the phenomena which I tried to make plain to her, as much as it was possible under the circumstances.

A quotation from her written account may be of interest: "When I was nine years old, one day, I remember, I sat down on a stone and suddenly I heard a voice: 'If you live four or five years more, you will wish you had never grown up.' I thought it was strange, but soon forgot it and went to play again. I had no trouble until I was fourteen, when the voice changed and forced me to talk with my own voice. The voices would make me speak of things that in my own self I had no idea of doing and would not do for anything. About eight years ago I had a terrible fright after which I thought I talked with saints and angels and saw unusual things, I really saw them." We find here the presence of automatic speech, unconscious phonation with subconscious states resulting in dissociations of secondary from primary sensory elements with the consequent formation of various forms of hallucinations.

Observations and experiments incontestably prove that hallucinations are synthetized compounds of secondary sensory elements, dissociated completely or incompletely from their primary elements. Normal and abnormal perceptive processes do not differ psychologically as to their make-up, except in the relation of their primary and secondary sensory elements. Hallucinations are not central; they are essentially of peripheral origin; they are induced by peripheral excitations giving rise to peripheral physiological processes, awakening primary sensory elements which are subconscious or fall out entirely of the patient's consciousness, leaving the groups of secondary sensory elements to stand out as fully developed hallucinations. The hallucinatory secondary sensory elements may be tinged with the qualitative aspect of the dissociated primary sensory elements; thus pathological processes in the auditory sense organ may give rise to voices; or morbid processes of the visual apparatus may give rise to visions. Quite often, however, the dissociation is so deep and extensive that the synthetized system of secondary sensory elements does not bear the least trace of the qualitative aspect of the primary sensory elements; thus a morbid condition of the pharynx, for example, may give rise to an auditory and even to a visual hallucination. Whatever may be the qualitative character of the sensory compounds one thing stands out clear and distinct, and that is the fact that the percept, whether normal or abnormal, does not consist of images, but of sensations, primary and secondary.

CHAPTER XXIII

THE ATTRIBUTES OF SENSORY ELEMENTS

CONTRARY to the view maintained by many psychologists we have laid special stress on the fundamental qualitative difference between image and sensation. We shall not venture far from our facts, if we arrange images and sensations in two qualitatively different psychic series. Sensations can be ranged in a graduated series of *intensities,* while images or representations can be ranged in a graduated series of clearness and distinctness, or of *vividness,* as it is sometimes described by some psychologists. I use the term vividness in the sense of clearness and distinctness and not in the sense of intensity as it is often used; even those psychologists who do not use intensity and vividness indiscriminately ascribe both of them equally to sensation and image.

Vividness and intensity are understood by me to be two fundamentally qualitatively different aspects, or attributes. Sensations have intensity, but no vividness; images or representations have vividness, but no intensity. Sensory elements may vary from *minimum* to *maximum* intensity. This variation in intensity holds true both of primary and secondary sensory elements. Similarly, images or representations may pass through all degrees of vividness from *minimum* to *maximum.* The image represents the sensation. In this respect we may somewhat modify the well-known dictum of the sensationalists into: *'Nihil est in imagine quod non antefuerit in sensu.'* The sensory element is represented by its respective representative element.

The representative elements may refer with different degrees of vividness to the same sensory elements. An image with one degree of vividness can be substituted for another with a different degree of vividness and still refer to the same sensory elements. The degree of vividness does not change the qualitative character of the representation. Not so is it with the qualitative attribute of the sensation. The slightest change in the intensity of the sensation changes its qualitative character. A sensation with one degree of intensity cannot be substituted for another. A sound or a color of a definite intensity cannot be substituted for a sound or color of a different intensity. The two are different sensations and no sensation can substitute another. Sensations falling in the same series of intensity are really independent of one another, but each sensation of the intensive series can be represented by a whole series of representations of different vividness, from *minimum* to *maximum*. Different series of representative elements may also be regarded as independent, since they refer to independent sensations.

If we symbolize a series of sensory elements by the letters: A_1, A_2, A_3, A_4, A_5, . . . A_n; and if we symbolize the corresponding series of representative elements by a_1, a_2, a_3, a_4, a_5, . . . a_n, then the series of both sensory and representative elements may be symbolized by the following formula:

$$\begin{array}{cccccccc}
A_1 & A_2 & A_3 & A_4 & A_5 & \cdot\;\cdot\;\cdot & & A_n \\
a_1 & a_2 & a_3 & a_4 & a_5 & & & a_n \\
a_1^1 & a_2^1 & a_3^1 & \cdot & \cdot & & & \cdot \\
a_1^2 & a_2^2 & a_3^2 & \cdot & \cdot & & & \cdot \\
a_1^3 & a_2^3 & a_3^3 & \cdot & \cdot & & & \cdot \\
a_1^4 & a_2^4 & a_3^4 & \cdot & \cdot & & & \cdot \\
a_1^5 & a_2^5 & a_3^5 & \cdot & \cdot & & & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & & & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & & & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & & & \cdot \\
a_1^n & a_2^n & a_3^n & a_4^n & a_5^n & & & a_n^n
\end{array}$$

The characteristic of the image, or of the representative element is just its extraordinary plasticity and possibility of substitution. This function of substitution was described by Taine with all the power of his lucid style. The great modifiability of representation plays an important rôle in psychic life—adaptability to various conditions of life increases, reactions cease to be rigid and uniform, but change easily in response to a changing environment. Variations of sense-organs with their physiological processes are rather slow and tardy, often requiring generations for an effective change, while the representative element can be modified and adapted within the life-existence of the individual and often in a very short time. In brief, *the function of substitution possessed by the representative element in the processes of mental selection is the substitute for natural selection in the highest representatives of animal life.*

Now under ordinary conditions of life the graduated series of representative vividness runs parallel to the gradated series of sensory intensities. Usually a more intense sensation is represented with greater vividness. The increase or decrease of intensity of the sensory series has a corresponding change in the vividness of the elements of the representative series. Intensity and vividness vary directly. Such direct variation, however, is not always the rule. There are cases, when the two part company. In states of distraction, in subwaking states, in states of dissociation, and generally in the conditions of functional psychosis, intensity and vividness do not vary directly.

Strong stimulations may give rise to sensations of great intensity, but the vividness of the representative elements may fall so low as almost to reach the *minimum*. When the vividness is so low as to reach the *minimum*, the representative elements cannot be used as substitutes and, since reproduction belongs to representative elements which symbolically reproduce the sensations by the process of substitution, reproduction or memory of the original experience is absent and there is a break, a gap in mental continuity, dissociation results. *The depths and extent of dissociation of mental systems may be regarded as variables of vividness. Dissociation varies inversely as vividness.* When vividness is at its *minimum*, dissociation is at its *maximum*. The phenomena of functional psychosis having their origin in states of dissociation may thus be regarded psychologically as functions of vividness, the most characteristic attribute of representative elements. *Functional psychosis with all its protean manifestations, the great variety of dissociated and subconscious states may thus be reduced to variations of one fundamental attribute—vividness.*

CHAPTER XXIV

SENSATION AND EXTERNAL REALITY

WE must not omit to point out another fundamental difference between sensory and representative elements. Sensations have the significance, or possess the attribute of external reality, while images, ideas, or representations entirely lack it. Put in Baldwin's terminology—sensations have the coefficient of external reality, the sensory coefficient of reality. No matter whether the sensation was produced by an external stimulus, or by a pathological process going on in the sense-organ, or brought about indirectly through the action of another sense-organ by means of indirect association-paths; no matter whether the sensation is primary or secondary, as long as it is a sensation at all, it possesses the sensory coefficient of reality. A sensation whether 'true or false' possesses rightfully the coefficient of reality as its necessary and inherent attribute. The percept, true or hallucinatory, consisting of sensory elements, has therefore the sensory coefficient of reality.

Psychologically regarded, the 'true' percept and the hallucination have the same sensory constitution with the same attributes. The difference between the true and false percept may be regarded from a biological standpoint as a matter of adjustment. The percepts with successful adjustments are true, while those with unsuccessful motor reactions are false and hallucinatory. Psychologically, the difference between the 'true' percept and hallucination is in the *shifting* of the primary and secondary sensory elements. *Where the secondary sensory elements can be shifted and become primary, the percept is regarded as true; where the secondary sensory elements do not admit of being shifted and becoming primary, the percept is regarded as hallucinatory.*

If we turn now to the representative elements, we find that they lack the sensory coefficient of reality. This lack of sensory coefficient is only the negative side of the image. There is also a positive side to it. The image is not felt as image, because it is not sensation or lacks the sensory coefficient, but because it possesses a qualitative character of its own. A sensation is not felt as such, simply because it lacks the character of another sensation. Thus sensation green is not experienced as the particular color sensation, because it has not the *quale* of sound or of pressure, but because the sensation green has a positive experience of its own. The same holds good of the representation—it possesses its own characteristic *quale*. As an experience *sui generis* we claim for *the representation a special psychic mark,* an *'ideational or representative' coefficient.* The image has its own qualitative character just as the sensation possesses its own. In contrast to the sensation which possesses the coefficient of external reality, the image or representation has the coefficient of internal reality. Both sensation and image have reality, each one has its own kind of reality—the sensation has external *objective* reality, the image has internal *subjective* reality. It is on account of the ideational or representative coefficient that every image is placed unhesitatingly into its own world of reality, into its own series of images with which it easily associates and fuses.

Writers on psychology in trying to define further the coefficient of reality refer it to the will. Some maintain that the coefficient of reality is the 'independence of the will,' while others claim that the coefficient of reality is 'subjection to the will.' Baldwin in his paper 'The Perception of External Reality,' offers an extremely interesting solution which reconciles both views. He points out that there is a difference between the 'memory coefficient' of reality and 'sensational coefficient' of reality. The two coefficients are opposite as far as control of will is concerned. The sensational coefficient is independence of the will, while the memory coefficient is control by the will. A sensation, in short, is not under the control of the will, while an image is subject to the will.

Baldwin makes a further distinction between a simple image or 'memory image' and a 'memory image of external reality.' The memory image can be brought up voluntarily by its proper associates, but it has no sensational coefficient as a result, while the memory image of external reality can be followed by sensational coefficients, that is, sensations can be brought about in the train of such an image. To quote Baldwin: "Certainly a present sensible reality is not under the control of my will; it is independent, and if my coefficient is to be discovered in the relation of the presentation to my voluntary life, this must be its expression and I go over to the class of writers who find the psychological basis of external reality in sensations of resistance. But when we come to inquire into the 'memory' coefficient—asking the question what character is in a memory-image which testifies to its being a memory of reality, the tables seemed to be turned. Without stopping to examine other views, I hold that that image is a true memory which we are able to *get again as a sensation* (Baldwin's italics) by voluntarily repeating the series of muscular sensations which were associated with it in its first experience. The memory coefficient therefore is subjection to the will in the sense indicated. . . . A true memory in short is an image which I can get at will by a train of memory associates, and which, when got, is further subject to my will; a memory of external reality, on the contrary, is an image which I can get at will by a train of sensational associates and which, when got, is not subject to my will."

Now if I understand Baldwin aright, a sensation does not fall under the control of the will, while a simple 'memory image' and a 'memory image of external reality' are both under the control of the will, the difference being that the former does not terminate in a sensation, whereas the latter does. This I take to mean that a sensation does not depend on the subject (will), but on the external objects; in other words, a sensation cannot be produced from center to periphery (not internally initiated by the will), but is initiated by an external excitation peripherally stimulating the sense-organ and giving rise to sensation. An image, on the other hand, does not depend for its initiation on the external object or excitation, but is essentially an internal event which can be brought about from within by the process of associative activity, so highly characteristic of the image. Thus far my analysis seems to me to be in full accord with Baldwin's view. Similarly, Baldwin's views in regard to 'memory images' and 'memory images of external reality,' the former not ending in sensory experience, the latter terminating in experience with sensory coefficient, seem to me to be closely related to the views expressed by me in this work and in my other works on the subject.

In spite of the agreement on so many points there are other points which do not appear to me acceptable. We may agree that kinæsthetic and muscular sensations or sensations of resistance are at the core of things, but are they the *be-all* of external reality? Have not sensations of pain, of hearing, of color, or of smell as much reality as our sensations coming from muscle, joint, synovial membrane and articular surfaces? The acute, shooting, twinging pains of rheumatism, gout, tabes-dorsalis, the burning pains of meningitis, the excruciating throbs of megrim, the fine stabbing pains of toothache, the agony of angina, the sharp tormenting pains of facial neuralgia, and many other pains coming from different organs and tissues, are not they real and external? In fact, do they not bear on them more the mark of grim, pitiless, external necessity than any of the sensátions coming from active muscle and joint? What about light, color, sound, smell, are not they sensations of external reality, even if sensations of resistance do not enter into their make-up?

Muscular and kinæsthetic sensations may be granted to play an important rôle in our knowledge of things, but psychologically regarded, all sensations bear on them unmistakably the mark of external reality. It is not the particular form or kind of sensation, but it is the sensory *quale* as such, that gives the coefficient of reality. As far as resistance is concerned Baldwin is right, if it be applied to each and every sensation. For each and every sensation possesses this mark of stubbornness about it; it shows opposition, resistance, and floods the mind. We may say that the stimulus forces open the gates of the sense-organs and invades the mind with an overwhelming power. Still, on the whole, Baldwin is right in laying special stress on sensations of activity and resistance, since, biologically regarded, they are the ones that give the smack of life and the kernel of things and help to bring about adjustments to the external environment.

Thus far the difference between Baldwin and myself seems to be rather insignificant.* When, however, we reach what Baldwin terms the 'memory image of external reality' the difference stands out somewhat more strongly. He contrasts the two, image and sensation, on the basis of dependence or independence of the will. The sensation is independent of the will, while the memory image of external reality is subject to the will which *can bring about the sensation originally experienced*. Now it seems to me that we are just as sure of the external reality of a sensation referred to by the memory image, even if we *cannot* bring about the original experience. We may perceive sensations which cannot possibly be repeated, and still they are regarded in memory as events that have taken place in the world of external reality. We may have the perception of a comet which may never again come

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*The difference is far less than I have originally thought. In a letter to me Professor Baldwin writes: "I am much interested in your views. You will find my later and fuller treatment of resistance and of the nature of memory images in my *Thought and Things, or Genetic Logic*, where I attempt explicitly to trace the genetic development of knowledge from sense objects to image objects in detail, being I think nearer to your views than my earlier article brought out."

into our experience, and even if it should come, its coming is not due to our voluntary control; it is not *we* that can make the comet-experience come into our perceptual or sensory world with its sensory coefficient of external reality. We may be in the position of Plato's cave-dwellers and have no control over reality, the reflection of which is displayed before us, and still we may agree with Plato that for the cave-dwellers the memory images of external reality, the recurrence of which is not under control, will still be discriminated from a general memory image, from an image of fancy. The sensation or percept may be unique, its reproduction may not be possible, and still its memory image will be that of external reality.

On the other hand, we meet in psychopathology with a vast domain of phenomena, such as recurrent mental states, insistent ideas which force themselves on the patient's mind against his will. The recurrent mental states or the insistent ideas are far more stubborn and uncontrollable than any resistant sensory object. The idea may come like attacks which overcome the patient more than any sensory reality, or the idea may be persistent gnawing at the very vitals of his mental life. No external object is so stubbornly, so painfully resistant as just such an idea; and still the insistent idea is not regarded as a sensory reality. The insistent idea possesses the coefficient of external reality, independence of the will, painfully so, and still it is not regarded by the patient as external reality; in spite of its being independent of the will, it is still regarded as an idea.

It seems to me that we cannot express the sensational and ideational coefficients in terms of will, of control or non-control. It is not resistance to the will that makes experience sensory, nor is it subjection to the will that makes experience ideational or representative. Why not state the fact as it is? External reality is the *quale* of sensory experience, while internal reality is the *quale* of the image or representation. A sensation is experienced as sensation, no matter whether or no it depends on the will, the independence is a secondary matter; the same holds true in the case of the image, it is experienced as image, independent of the fact of its subjection to the will.

There is another view which finds the fundamental difference between percept and image in what is and what is not common to all selves. Perceptual experience is common, while ideational experience is not common to all fellow-beings. I see the sun and other people can share it with me, while my image of the sun is experienced by myself. Thus Calkins tells us: "I perceive lowering heavens, pouring rain, bare trees and drenched sparrows, but I imagine wide horizons, brilliant sky, blossoming apple-trees and nestling orioles. The main difference is this: in the one case I assume that my experience is shared by other people and that everybody who looks out sees the same dreary landscape; but my imagination of the sunny orchard I regard as my private and unshared experience."

The mark of being common is not the essential coefficient of external reality given by the percept. The percept is not experienced as external, because it is common to other people. We do not see the tree yonder, because other people can see it too; we would see it there, even, if, like Robinson Crusoe, we had no fellow-being to compare notes with. A hallucination is as fully a percept and is perceived in the full garb of external reality, although it may have no currency with my fellow-men. The percept possesses the coefficient of external reality, no matter whether or no others can share in it.

Moreover, psychologically regarded, the percept is as much of a private experience as the image is. In fact, every psychic state has the privacy ascribed to the image, and as such is unshared by other selves. It is simply the old psychological fallacy of confusing the physical with the psychic object, or with the psychic state cognizant of the physical object.* The flower as physical object, as stimulus, is shared by all who perceive it, but the perception of the flower varies with each individual. My perception of the flower cannot be experienced by any one else; like the image, the percept is entirely individual, unshared by other selves. I perceive the flower as having external reality, not because my perceptual experience is the same as that of other people, not because it is shared with others—as a matter of fact, it is *not the same,* and from its very nature *cannot* be the same as the experience of others, as we *cannot possibly share* our individual psychic experience with our fellow-men. We perceive the flower as an external reality simply and solely because it is *sensory.* The percept consisting of sensations, primary and secondary, bears the impress of external reality; it possesses what Baldwin so aptly terms 'sensational coefficient' giving external reality. External reality is given directly and *immediately* by the sensation or by the sensory compound, by the percept.

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*Royce and Münsterberg define the physical object in terms of 'sociality,' but if I understand them correctly they do not regard the definition as a psychological one.

To quote from a work of mine: "Sensation carries along with it the reality of its stimulus. It is not that the sense of reality is different from the sensation, it is given in the sensation itself. Similarly the percept and the sense of external reality are not two different things; they are given together in the same process of perception and are identical. . . . The sensory process is also the process of the sense of external reality. . . . In seeing or perceiving the chair yonder we do not perceive it as real, because of its social or common character—the reality of its existence is given directly in the sensory processes of the percept itself. . . .

The sense of reality of the external object is strengthened by association of the original sensory systems with other sensory systems, and the intensity rises in proportion to the number of systems of sensory elements, brought into relation with the functioning sensory systems. . . . The more systems of sensory elements are pressed into service, the stronger is the sense of external reality and the more assured is the reaction to the stimuli of the external environment.

In the evolutionary process of man's adaptation to his environment he becomes extended in being and grows more developed, because of his social relations. Man presses into active service the systems of sensory elements of his fellow-beings. Adaptations and hence successful reactions to the external environment are now more assured and the sense of external reality is still further emphasized and intensified. Throughout the course of intensification of the sense of reality the principle remains unchanged in nature. The sense of reality is given by and consists in nothing else but the sensory elements."

From a philosophical and epistemological standpoint the social aspect may perhaps be sufficient to fix the externality of the object, but from a psychological standpoint the trade-mark of 'shares and common stock' has no currency. The percept consisting, as we have shown, of sensory elements, primary and secondary, possesses, on that account, the sensory attribute of external reality.

CHAPTER XXV

THE SUBCONSCIOUS AND UNCONSCIOUS CEREBRATION

PLATO put on the portals of his academy the inscription, "No one can enter here without a knowledge of geometry." Similarly no one can gain access to the facts of abnormal psychology without a thorough understanding of the subconscious. The subconscious may be briefly defined as mental processes of which the individual is not directly conscious. Such knowledge is all the more requisite as *psychopathic disturbances with which psychopathology proper deals are essentially affections of subconscious life activity.* The general drift of my *Psychology of Suggestion* is the description of the subconscious as a diffused consciousness below the margin of personal consciousness. I sometimes use the term "subconscious self." I designate by "self" not personal consciousness, but mere consciousness. In *Multiple Personality,* in which I develop the theory of thresholds in regard to the phenomena of normal and abnormal mental life, I define the subconscious as consciousness below the threshold of attentive personal consciousness. I find that my clinical and psychological investigations more and more confirm me in the view of the subconscious advanced by me in *The Psychology of Suggestion.* I am pleased to find that Prof. James, in a recent article, accepts the same view, and advances the same theory of threshold in regard to the subconscious. "Nobody knows," he writes, "how far we are 'marginally' conscious of these memories, concepts and conational states at ordinary times, or how far beyond the 'margin' of our present thought trans-marginal consciousness of them may exist."

In my *Psychology of Suggestion* I pointed out the difficulties of the purely physiological interpretation of the subconscious. Since this view still lingers among some psychologists, I cannot do better than reproduce the passage:

"The facts of hypnotic memory alone strongly indicate the intelligent nature of the subconscious. Can the theory of unconscious cerebration explain, for instance, the fact of suggested amnesia during hypnosis? I hypnotize Mr. V. F. and make him pass through many lively scenes and actions. I give him hypnotic and post-hypnotic suggestions. The subject is wakened and hypnotized time and again. At last he is put into a hypnotic state, and it is suggested that on awakening he shall not remember anything of what had happened in the state of hypnosis. The subject, on emerging from his trance, remembers nothing of what he has passed through. I then put my hand on his forehead and tell him in a commanding voice, 'You remember now everything.' As if touched by the wand of a magician, the suppressed memories become endowed with life and movement, and invade the consciousness of the subject. Everything is now clearly remembered, and the subject is able to relate the tale of his adventures without the omission of the least incident. So detailed is the account that one cannot help wondering at the extraordinary memory displayed by the subject. How is the theory of unconscious cerebration to account for this strange fact? Prof. Ziehen, in his *Phys-*

iological Psychology tells us that it is still a matter of doubt whether, despite their complication, all the acts of the hynotized individual are not motions accomplished without any concomitant psychical processes," and that "even the recollection of the hypnotic psychical processes do not necessarily argue in favor of their existence during the hypnotic trance." This extreme view is certainly wrong, for the subject during hypnosis not only acts, moves, but he also speaks, answers questions intelligently, reasons, discusses; and if such an individual may be regarded as a mere machine, on the same grounds we may consider any rational man as a mere unconscious automaton.

The advocates of unconscious cerebration must admit at least this much, that hypnosis is a conscious state. Now, on the theory of unconscious cerebration, it is truly inconceivable how psychical states can be suppressed, the accompanying physiological processes alone being left, and all that done by a mere word of the experimenter. The restoration of memory is still more incomprehensible than the suggested amnesia. A command by the experimenter, "Now you can remember," brings into consciousness a flood of ideas and images. It is not that the experimenter gives the subject a clue which starts the train of particular images and ideas; but the mere general, abstract suggestion, "You can remember," is sufficient to restore memories which to all appearances have completely vanished from the mind of the subject. Are the unconscious physiological nervous modifications so intelligent as to understand suggestions and follow them? Does unconscious cerebration understand the command of the experimenter, and does it oblige him to become conscious?

On closer examination, we find the term unconscious cerebration to be of so loose a nature that under its head are often recorded facts that clearly indicate the working of an intelligence. Thus, Mr. Charles M. Child brings the following fact as a specimen of unconscious cerebration: "I had earnestly been trying," a gentleman writes to Mr. Child, "to make a trial balance, and at last left off working, the summary of the Dr. and Cr. sides of the account showing a difference of £2 10s., the Dr. side being so much smaller. The error I had not found on Saturday night when I left the counting-house. On this same Saturday night I retired feeling nervous and angry with myself. Some time in the night I dreamed thus: I was seated at my desk in the counting-house and in a good light; everything was orderly and natural, the ledger lying before me. I was looking over the balance of the accounts and comparing them with the sums in the trial-balance sheet. Soon I came to a debit balance of £2 10s. I looked at it, called myself sundry names, spoke to myself in a deprecating manner of my own eyes, and at last put the £2 10s. to its proper side of the trial-balance sheet and went home. I arose at the usual Sunday time, dressed carefully, breakfasted, went to call on some . . . friends to go to church. Suddenly the dream flashed on my memory. I went for the keys, opened the office, also the safe, got the ledger, and turned to the folio my dream had indicated. There was the account whose balance was the sum wanted which I had omitted to put in the balance-sheet, where it was put now, and my year's posting proved correct."

The adherents of unconscious cerebration tacitly include under this term not only unconscious physiological processes, or nerve modifications, but also psychical states. Keeping clearly in mind the real meaning of unconscious cerebration as referring to physiological processes, or nerve modifications with no psychical accompaniment, the difficulties of unconscious cerebration to account for the phenomena of hypnotic memory become truly insurmountable. For if the physiological processes subsumed under the category of unconscious cerebration are completely lacking in all psychical elements whatever, how can a general abstract negative phrase, "You cannot remember," suppress particular psychical states, and how can a similar positive phrase, "You can remember," bring the forgotten memories back to consciousness? It is simply incomprehensible.

Furthermore, while the subject is in a hypnotic condition, we can suggest to him that on awakening he shall not remember anything, but when put to the automatic recorder he shall be able to write everything that has taken place in the state of hypnosis. The subject is then awakened: he remembers nothing at all of what he has passed through while in the state of hypnotic trance. As soon, however, as he is put to the automatic recorder the hand gives a full rational account of all the events. If now you ask the subject what it is he has written, he stares at you in confusion; he knows nothing at all of the writing. How shall we account for this fact on the theory of unconscious cerebration? Can unconscious physiological processes write rational discourses? It is simply miraculous, incomprehensible.

These, however, are not the only difficulties which the theory of unconscious cerebration has to encounter. Take the following experiment: I gave Mr. V. F.

the suggestion that on awakening he should put my coat on three times, take it off, and put it on again; that he should do it when he heard a signal which should be a knock; amnesia was suggested and also the possibility of writing the suggestion. The subject was then roused from his trance. There was not the slightest recollection of what had been suggested, but when he was put to the automatic recorder the hand at once proceeded to write everything. In the middle of the writing, "when a signal will be given . . .," I stopped the subject and asked him what he was writing about. "I do not know," he answered. "How is it," I asked again, "you write and do not know what you write?" "I do not know, I think it was something about a coat." "What was it you were writing about a coat?" "I do not know, maybe it was about the make of a coat." Then when the signal came, he rose and put on the coat three times.

To take another experiment of the same kind: I give the subject the suggestion that he should bow to the gas whenever the door should be opened; again amnesia is suggested, with the possibility of writing. The subject is stopped when he finished his account. "What was it you wrote?" I asked. The subject looked surprised. I repeated my question. "I do not know, I think something about a door." "What was it about a door?" "I do not know." I have made many similar experiments, and all of them with the same results. It is evident that the writing is not an unconscious automatic process, for the subject possesses a general knowledge of what he has written, or even of what he is going to write.

Now, on the theory of unconscious cerebration this general knowledge ought to be entirely lacking, since the physiological processes of the suppressed memory have no psychical accompaniment. It would not do to say that the subject knows each word as he writes it, but becomes unconscious of it, forgets it as soon as it is written down, because the subject is able to tell the central idea; that is, he has a general knowledge of it; and, what is more, he is able to tell us this general central idea even before he finishes the writing,—in fact, he can do it when stopped in the middle of the phrase. On the theory of secondary consciousness, however, the experiments could not possibly give other results. The secondary consciousness understands the suggestion given by the experimenter, accepts them, obeys the commands, keeps the suppressed memories, and sends up a general knowledge of them to the upper consciousness, and if commanded, communicates the suppressed particular suggestions in all their details.

The advocates of unconscious cerebration assume too much: they assume that normal memory, or recollection in the normal state, can be fully accounted for by unconscious physiological processes, and the only thing required is to apply this theory to the phenomena of hypnotic memory. It would be well to examine this theory and see how strong its claims are in the case of normal memory.

Many a modern psycho-physiologist no doubt smiles at the crude, ancient psycho-physiological theory of perception. Images or copies of objects emanate from objects, get deposited in the mind, hence perception, cognition, memory. The modern psycho-physiological speculations, however, the speculations of Maudsley, Carpenter, Ziehen, Ribot, etc., are no less crude. Thus, Ziehen, for instance, conceives that each sensation deposits a copy of itself,—an image, an idea, in some one of the memory ganglion cells, and memory consists in the reproduction of this copy,—the hen lays an egg from which another hen may come out. Maudsley expresses the same thing in slightly different terms; instead of "deposits of images in memory ganglion cells," he uses "modifications of nerve elements." "It may be supposed," says Maudsley, "that the first activity did leave behind it, when it subsided, some after-effect, some modification of the nerve element, whereby the nerve circuit was disposed to fall again readily into the same action, such disposition (unconscious) appearing in consciousness as recognition or memory." Ribot and many other psychologists, with slight variations in minor points, follow the same beaten track. All of them agree that it is the nerve modifications produced by the physiological processes of sensations, emotions, etc., that constitute the basis, nay, the very essence, of memory itself.

It does not require a close examination to find the deficiencies of this theory. A mere modification left behind as a trace cannot possibly explain memory, recollection, the fact of referring a particular bit of experience to an experience felt before. The retention of a trace or of a nervous modification, and the reproduction of that trace or modification, cannot in the least account for the fact that a series of sensations, ideas, images, emotions felt at different times, should become combined, brought into a unity, felt like being similar, like being repetitions, copies of an original experience. *It is not retention or reproduction, but it is the recognition element that constitutes the essence of memory.* The rose of to-day reminds me of the rose of yesterday, of the same rose seen the day before yesterday. Now the image of the rose may be retained, may even be reproduced, but if it is not recognized as having happened in *my* past, there can be no recollection. In short, without personal recognition there is no memory. As James strongly puts it, "the gutter is worn deeper by each successive shower, but not for that reason brought into contact with previous showers." Does the theory of unconscious physiological processes, of material brain traces, of nerve modifications, does the theory take into account this element of personal recognition? Can the theory of unconscious cerebration offer the faintest suggestion as to how that element of recognition is brought about? What is that something added to the unconscious physiological trace or nerve modification that effects a conscious recognition?

Furthermore, first impressions can be localized in the past, but so can also each subsequent revival. How shall we explain on the theory of unconscious physiological nerve registration that the original, the primitive sense experience, as well as each subsequent revival, can be referred to as distinct psychical facts. For if the structural nerve elements are slightly modified with each revival, how shall we account for this psychical distinction of the original sense experience as well as of the modified revivals? The remembered experience leaves its own individual trace, then a trace of its being a copy of a former original impression, and also a trace of its being a member in a series of similar traces, each trace being a copy of another and a copy of the original impression. How all that is done is a mystery."

These objections advanced by me many years ago hold true of recent theories which fall back on the old views of Mill and Carpenter, namely, unconscious cerebration. The modern upholders of unconscious cerebration think that they have discovered new facts and arguments in favor of unconscious mental activity, and are thus justified in denying subconscious mental life. The arguments, as we have pointed out, are not new, nor are the facts advanced in support of these arguments true. The same objections hold true in the case of the theory of unconscious cerebration offered us in the garb of nerve currents and nerve paths, well worn nerve tracks, opening and closing of nerve currents and tracks, and formation of all shapes and forms of neurograms. Why be misled by figments and by sounds? The subconscious stands for a number of facts, reactions, and behavior which are accompanied by psychic life, by mental activities, by *consciousness.*

The physiological unconscious registration theories of nerve currents, nerve-paths, and neurograms are not only figments, arbitrary fanciful weavings of the imagination, they cannot even hypothetically explain the simplest act of memory, and especially of recognitive memory.

Since the theories of unconscious registration fail us in the most elementary mental processes, how can we possibly rely on cerebration-fancies in the case of such complex phenomena as hypnotic conditions and various mental states of trance and dissociation? The physiological theories, such as unconscious cerebration and its modifications, failing, we must use for all those phenomena the psychological interpretation. The subconscious must be taken as a necessary theory in psychopathology, as atoms, molecules, electrons and ether are in chemistry and physics. The subconscious is not an "unconscious," it is not a physiological automatism. The subconscious is a consciousness, a secondary consciousness, a sort of secondary self, the self being understood by me as a *diffused consciousness.*

CHAPTER XXVI

THE SUBCONSCIOUS AND AUTOMATISM

THE theory of unconscious cerebration dies hard. Recently a few psychologists made an attempt to revive it. The arguments advanced are rather philosophical than psychological. It may be well to test the validity of these arguments. If we clear the ground of all superfluous speculations, we find two main contentions. In the first place, it is assumed that many hypnotic and hysterical manifestations are solely the result of physiological activities. It is claimed by some, such as Münsterberg, that physiological processes without any psychic accompaniments, may reach such a high state of complexity as to account fully for all the observed manifestations in the different forms of mental dissociations. In the second place, it is claimed, from a purely philosophical standpoint, that even in the case of dissociation when consciousness may be granted to be present, there is no dissociation in consciousness itself, since consciousness is but a passive onlooker while the active changes go on in the content of consciousness; in other words, in states of dissociation it is not consciousness that is changed, but only the content of consciousness.

Let us examine these contentions and see whether they can stand the test of critical analysis. The view of regarding mental activity from a purely physiological standpoint is not new, it dates as far back as Descartes, who regards all the animals, with the exception of man, as mechanical automata. The philosopher, Maimon, in his "*Autobiography*" tells an anecdote on himself. In his youth Maimon was an ardent adherent of Cartesian automatism. During one of his strolls with a friend Maimon struck a goat. The animal bleated. The friend rebuked Maimon for his cruelty. Maimon laughed at the simplicity of his friend.—"The goat is like a drum which sounds when it is beaten."

Huxley carried this view further, regarding consciousness as an epiphenomenon. The physiological mechanism is the engine, consciousness is but the whistle accompanying it.

Of course, it goes without saying that psychologists and physiologists at present assume that all states of consciousness are accompanied by physiological processes. Every thought, every feeling, even the most complicated poetical inspiration, or the most abstruse mathematical, logical, and metaphysical speculations, have physiological processes as their accompaniments. We are, however, hardly justified in carrying this postulate to the absurdity of the total denial of consciousness, and regarding all adjustments and adaptations as so many chemical and mechanical reactions—"tropisms," as some modern biologists, such as Loeb and others, are apt to put it in the case of many animals, a reversion to the Cartesian hypothesis of mechanical automatism. Motor reactions can be regarded solely from the physiological standpoint, but consciousness cannot be entirely ruled out. What probability is there that a play of atoms and electrons would produce the *Iliad, Hamlet,* the *Principia* of Newton, the *Celestial Mechanics* of Laplace, or Darwin's *Origin of Species?*

Even if we descend to such motor reactions as are expressed in the compositions of a schoolboy, we still unhesitatingly assume a conscious activity. We cannot refute the philosopher who would regard all such manifestations as so many physiological processes without any conscious accompaniment. For though every one is directly conscious of his own mental life, no one can experience directly the mental life of another. We cannot inspect directly the psychic processes that go on in other living beings, or in our fellow men. Mind is inferred from action, from behavior. Reactions, adjustments to environment, accompanied by consciousness, by intelligence in us, are rightly judged to have the same accompaniment in other beings, in our neighbours. To deny consciousness to our neighbour, and to regard him as a physiological automaton, is to put oneself in the absurd position of denying the existence of states which are observed in ourselves under similar conditions. In fact, the burden of proof falls on those who make such a denial.

Now, in the case of hypnosis or various states of dissociation, we meet with intelligent adjustments often expressed in gestures, writing, and speech. We can, by means of various methods, enter into active relationship with those dissociated activities, unknown to the individual himself. We can obtain intelligent replies to our questions either by writing, or by speaking, or by other arranged means of communication. What right have we to deny consciousness in one case while we affirm it in another case under similar circumstances? When I receive a letter from my friend I regard the letter as having been written by a being who possesses consciousness, but when a similar letter is written by a friend in a hypnotic or post-hypnotic state, we regard it as the result of physiological automatism, with no conscious accompaniment. It is clear that the denial of consciousness to the hypnotic individuality is purely arbitrary. It is certainly arbitrary in the case of double or multiple personality to regard one personality as conscious and the other personalities as purely automatic, with no consciousness in them. It would have been more consistent, if the psychologist were to take the solipsistic point of view and deny consciousness to all else except himself.

The arbitrary standpoint of the psychologist who denies secondary and multiple consciousness can be still further made clear in the case of coexistent, dissociated mental activity. Thus one hand of the subject or of the patient may write a letter, while the other hand may be engaged in drawing or writing a composition, of which the individual is not cognizant. Both hands enter independently of each other into communication with the external observer. The communications are independent and equally intelligent. In each case we get intelligent replies and reactions to our questions and stimulations. Which of the two is supposed to be conscious? To take a concrete experiment. Mr. M. presents phenomena of dissociation. When in one of those states of dissociation Mr. M. is made to write a letter with one hand, while the other hand, being anaesthetic, is put under a screen and made to carry out a calculation. One hand replies to questions, while the other solves problems. Both hands give intelligent replies. To which of them is consciousness to be ascribed? If we deny it in one case, we should also deny it in the other. But, then, why not be consistent, and deny it in every case of intelligent adjustment? We realize how arbitrary and illogical is the position of those psychologists who coquet with physiology under the delusion that they are more scientific. They are led to take arbitrary positions which lead into the pitfalls of solipsism, with all its contradictions and absurdities.

Besides, physiological processes are, after all, but hypothetical concepts; physiological currents are conceived after the model of electrical currents, and are by no means theoretically proven. While they should be used for the sake of a better elucidation of the facts, it is not good scientific sense to sacrifice to them the very material of the science of psychology. Sensations, ideas, feelings, emotions, are after all the direct data of the psychologist, while physiological processes and currents are purely hypothetical. When, therefore, these hypothetical entities lead not to a better understanding of the facts of mental life, but to their denial, the very purpose of the hypothetical creations is completely defeated.

Physiological processes are framed to explain states of consciousness with their motor reactions. When, therefore, these hypothetical creations threaten to sweep away the actual living facts, it is time to halt and examine closely the sterile character of the hypothesis. The central fallacy lies in the tacit assumption that unknown and possibly unknowable, highly problematical brain currents, with their "opening and closing valves," with "well worn or blocked paths," all of a purely conjectural character, have, by their ingenious complexity, become, likes marionettes, so marvellously endowed with sense-like activities as to dispense completely with the mental states which these conceptual entities were called in to explain.

Clinical cases and experimental facts go further to invalidate the theory of the purely physical interpretation of the subconscious, or what may be described as automatism-psychology. If anything is of the utmost importance in mental life, it is surely memory. Memory forms a unity of our life, brings, so to speak, to a focus our life-experiences, which would have otherwise been disconnected, confused, and chaotic. I remember just now what I did an hour ago, a day ago, what I lived through many years ago. I remember the experiences of my childhood, boyhood, and youth. I remember my struggles and disappointments, my loves, my friendships, my enmities, my feelings, sentiments, emotions, ideas, and sensations. All these inter-connected, interlocked links of memories form the solid chain of my conscious personality.

In my memory of the past experiences there is the present consciousness that all that I had gone through at the time of the experience—any change, any modification, that had taken place—occurred in *my* mind, in *my* consciousness. Unless under delusion or illusion of memory we cannot remember what did not occur in consciousness. *We cannot remember what we were not conscious of.* The past mental state which the present memory refers to is a state of consciousness; otherwise memory is impossible and meaningless. Memory, recollection, reminiscence, can only refer to *a previous state of consciousness.* Surely no one else can have a better and more direct knowledge than I myself have of the ideas, emotions, and moods that I remember, as experienced by me.

The memory factor is all the more important in psychology, since we have to take account of the subject's inner experiences. In each case of memory the burden of proof falls on those who deny the validity of that memory, as referring to a past state of consciousness. Suppose I have a memory in a full state of consciousness that I lighted a lamp an hour ago, the burden of proof would fall on those who deny the existence of such a state. It would be an arbitrary, if not a preposterous position for an outside observer to claim that the lighting of the lamp was carried out mechanically, by a physiological automatism, and that the subsequent memory was but an illusion. The onus of proof that the original act had no conscious accompaniment is entirely on those who take such a position in opposition to the direct introspective account. Where such a proof is not forthcoming, the position taken is arbitrary. Were we to take such a position, the very science of psychology would become an impossibility, since all memory would have to be declared a snare and a delusion. All psychological studies based on introspection and memory would have to be abandoned, and we should have to follow Comte, and declare psychology an impossibility. A psychologist maintaining such a point of view is, from the very nature of his attitude, disqualified to give his opinion; he must fall back on physiology, and rule out all psychology.

If, however, memory and introspection are not rejected, then the recollection of a conscious state should not be arbitrarily dismissed, unless there are good reasons for such a dismissal. Now, the hypnotic subject, or the patient, in the case of functional psychosis, undergoes an experience of which he is apparently unconscious. In a subsequent state, in a hypnotic or trance state, he actually recollects that the experience was a conscious one; we cannot possibly reject this recollection as an illusion of memory. The burden of proof that the former state was not a conscious one falls on him who denies the person's mental experience. Such a proof is all the more requisite, since it can be demonstrated that in subconscious states there is really present a subconscious consciousness.

CHAPTER XXVII

THE SUBCONSCIOUS AND THE PASSIVE CONSCIOUSNESS

DRIVEN out of the psychological fortress, some psychologists of the philosophical type (Münsterberg) still take refuge in the metaphysical citadel. It is claimed that, psychologically, mental life is analyzed into consciousness and its content. Now, it is further assumed that all mental modifications occur in mental contents, but not in consciousness. Consciousness, itself, is supposed to be a passive, immutable looker-on, a sort of psychic deity. We thus have a mental content which is not conscious and a consciousness, the blessed Buddha in his blissful state of Nirvana. Consciousness is regarded in the light of a substance which contains the mental content somewhat after the fashion of a material substance underlying physical qualities. This view of an underlying, immutable substance, with a changing qualitative content, was long ago criticized by Hume, both in the case of mind and body. The assumption of an entity underlying observed phenomena, whether physical or mental, has since become so weakened that it is no longer regarded as a living hypothesis among thinking men of science.

We can see at a glance that the substance-consciousness with its changing qualitative content is but a piece of metaphysical speculation, it is a revival of the old soul-hypothesis, long ago buried by modern psychologists. The soul-consciousness hypothesis must be rejected, for the simple reason that it complicates matters, and explains nothing. In fact, the hypothesis of an imperturbable soul-consciousness from the very nature of its hypothetical being, itself requires an explanation, while it does not in the least explain the mental content, which is the material of the psychologist. Such a passive, changeless soul-consciousness is a sort of box in which the content of soul-consciousness resides and has its being. This soul-consciousness is but a survival from a past metaphysical period.

In the case of double and multiple personalities it is claimed that while the personalites are different, their consciousness is not different, but one and the same. In the different personalities found in the case of multiple personality, there is among them but one consciousness, somewhat like the Greek myth of the three old women with one eye among them. By a parity of reasoning we may say that the minds of different individuals, such as John's and Peter's, are really identical. John and Peter are different personalities with different contents, but with the same consciousness. In fact, we may generalize further and say that the whole human race and the beasts of the field and the birds of the air share in one and the same indivisible, passive, immutable consciousness, a sort of world-soul. This may be a grand metaphysical speculation, but it is neither psychological nor scientific.

There is another objection to the subconscious, an objection based on an artificial fast and hard line drawn between the purpose of science on the one hand, and that of will on the other. Science, it is claimed, deals with artificial concepts, while personal will is concerned with the real values of life. It is claimed that the concept of the subconscious is illegitimate, because it involves a confusion of this metaphysical double bookkeeping.

The world of description and the world of appreciation were brought out and contrasted by Professor Royce in his early works, and afterwards elaborated by a few psychologists of the Schopenhauerian tinge. The division is not new, and dates back to the Middle Ages, with its split of science and philosophy on the one hand, and religion on the other. It is the doctrine of the twofold truth (Die Lehre von der zweifachen Wahrheit). According to mediaeval thought, there are two realms, the realm of knowledge and the realm of faith; the realm of intellect and the realm of will. What is true in the one may not be true in the other. From Maimonides, Ibn Gabirol, Albertus Magnus, Thomas Aquinas to Duns Scotus and Occam the same doctrine of the twofold truth and the two realms prevailed. The scholastic could say anything he wished provided he was cautious to claim that what was true *secundum rationem* was not true *secundum fidem*.

This double view still survives in some philosophical quarters. Instead of finding fault with the subconscious for ignoring this time-honored double truth, it should rather be regarded as a special merit. As a matter of fact, the subconscious, unless interpreted in metaphysical terms of a cosmic self, has nothing to do with the heirloom of metaphysical mediaeval thought. The subconscious is based on experience and facts to which philosophical and metaphysical distinctions should adapt themselves.

We thus find that the objections to the subconscious are based on insufficient grounds. We also find that the abandonment of the subconscious leads to a tangle of difficulties and to the quagmire of mediaeval metaphysics. If the metaphysical interpretation of the subconscious in the sense of a cosmic self lands one in the misty regions of religious mysticism, the opposite view of the total negation of the subconscious, apparently in the interests of science, lands one in regions no less shadowy, regions of naturalistic mysticism.

So fundamental, however, is the concept of the subconscious that even its opponents have to admit it under different names. They admit the fact of dissociation, of dissociated mental systems, and of dissociated personalities. But they put forth the hypothetical claim that it is one and the same consciousness present in all the different forms of dissociation. Now, if we omit that speculative metaphysical consciousness which, being inactive and unchangeable, is of no use in scientific work, we are really left with the mutations and permutations of mental systems which, from their very nature, must be *conscious*. The psychopathologist must postulate the subconscious just as the geometrician postulates space and position, or as the physicist postulates matter and force.

CHAPTER XXVIII

SUBCONSCIOUS AND UNCONSCIOUS IDEAS

THERE is a school which regards the subconscious as formed of "suppressed mental complexes." The views of this school are not psychologically clear. It seems, however, that the subconscious is viewed in the light of "unconscious ideas." "Unconscious Ideas" were discussed by me in my *Psychology of Suggestion,* and I cannot do better than to quote from that volume, "For the mechanism of consciousness is hidden deep down in the depths of the subconscious, and it is thither we have to descend in order to get a clear understanding of the phenomena that appear in the broad daylight of consciousness.

The German school, with Wundt at its head, at first started out on similar lines, but they could not make any use of the subconscious, and their speculations ran wild in the fancies of Hartmann. The reason of this failure is due to the fact that the concept of the subconscious as conceived by the German school was extremely vague, and had rather the character of a mechanical than that of a psychical process. An unconscious consciousness —that was their concept of the subconscious. In such a form as this the subconscious was certainly meaningless—mere nonsense—and had to be given up. The German psychological investigations are now confined to the content of consciousness in so far as the individual is immediately conscious of it. But as this form of consciousness is extremely narrow and circumscribed, the results arrived at, though remarkable for their thoroughness, are, after all, of a rather trivial nature. It is what James aptly characterizes as "the elaboration of the obvious."

This criticism applies well to Freud and his adherents. *Das Unbewusste* is conceived as "Suppressed unconscious idea-complexes." Of course, the claims of that school to originality and to the apparent unveiling of the causation of psychoneurosis are entirely unjustified. A "suppressed complex" is but another term for a dissociated system, commonly accepted in psychopathology. The special theories developed by that school in regard to desire, to sexuality, and to voluntary suppression of unpleasant or painful ideas are *entirely gratuitous and false* in the light of modern psychology and clinical experience.

This psycho-analytic school has unfortunately fallen back on the Herbartian psychology with its metaphysical Reals or ideas which by their mutual tension keep suppressing one another, thus determining the display of the contents of consciousness. As Herbart tells us: "Concepts become forces when they resist one another. This resistance occurs when two or more opposed concepts encounter one another." This proposition or principle proclaimed by Herbart is at the basis of Freud's mythical speculations. "A concept is in consciousness in so far as it is not suppressed," Herbart tells us, "but is in actual representation. When it rises out of complete suppression, it enters into consciousness." According to Herbart and his modern followers, suppressed ideas become forces and impulses. Concepts which are not opposed or contrasted with one another, so far as they meet unhindered, form a "complex," a favourite term used by the psycho-analytic school and its followers.

It may possibly be of interest to remark that Herbart is closely followed by the psycho-analytic school in regard to the doctrine of desire. Desire with Herbart is fundamental. "The faculty of desire must include wishes, instincts, and every species of longing." "The expression 'desire' must not be so limited as to exclude those wishes which remain, though they may be vain, or so-called pious wishes, and which, for the very reason that they do remain, constantly incite men to new efforts, because through them the thought of a possibility is ever anew suggested, in spite of all reasons which appear to prove the impossibility of attainment. It is very important to give the concept of the unattainability of the wished-for object strength enough so that a peaceful renunciation may take place of the desire. A man dreams of a desirable future for himself, even when he knows it will never come." These Herbartian doctrines, long ago abandoned by psychology, are now being revived by the marvellous, "scientific" psycho-analytic technique as a new discovery in the science of normal and abnormal psychology. No better criticism can be passed on this revival of Herbartian psychology in the domain of psychopathology than the one made by James: "I must confess that to my mind there is something almost hideous in the glib Herbartian jargon about *Vorstellungmassen* and their *Hemmungen* (suppressions) and *sinken* and *erheben* and *schweben* and *Verschmelzungen* and *Complexionen* (complexes.)"

It is claimed by some of Freud's younger adherents that the mechanism of "unconscious ideas," though a contradiction, is nevertheless justified, because of its being a conceptual construct, as Karl Pearson puts it, in order to aid the explanation of mental phenomena. This is a new epistemological argument in defence of a tottering system. It is truly amazing that science has nowadays become so philosophical that when a theory is unstable, it is unhesitatingly supported by epistemological considerations.

Perhaps it may be well to point out that self-contradictory hypotheses are not quite acceptable in science. A scientific hypothesis should at least have the merit of being rational, logical, and not conceived in a wild harum-scarum fashion. A good scientific hypothesis must have restrictions and definite conditions. I think it is Huxley who says that in the case of stolen goods two hypotheses are at hand: one hypothesis is that an angel is responsible for it, and the other that a thief has carried off the goods. The angel-hypothesis is hardly considered by science. In other words, the hypothetical causative agency must be conceived in terms of experience.

The hypothetical agency must either be a fact directly observed in nature, or a fact which can be verified later on. Thus the theory of gravitation is based on the facts of falling bodies; the theory of natural selection is based on the facts of the struggle for existence observed in the organic world. In short, a good scientific hypothesis must take as its causative agency a *vera causa,* a fact observable in experience, or a fact which can be verified by further experience. Atoms, electrons, ether, are not haphazard constructs; they are not regarded by the physicist as unreal fancies, unreal abstract notions to explain the real facts; but each of these hypothetical agents is regarded as real, as a *vera causa.* We cannot help agreeing with J. S. Mill on the subject of hypothesis: "I conceive it to be necessary, when the hypothesis relates to causation, that the supposed cause should not only be a real phenomenon, something actually existing in nature, but should be already known to exercise, or at least to be capable of exercising, an influence of some sort over the effect. In any other case it is no sufficient evidence of the truth of the hypothesis that we are able to deduce the real phenomenon from it." Again, "What is true in [Newton's] maxim is that the cause, though not known previously, should be capable of being known thereafter; that its existence should be capable of being detected, and its connection with the effect ascribed to it should be susceptible of being proved by independent evidence."

If we apply this very simple rule of logic to the theory of "unconscious ideas," we at once realize the illegitimate character of such a hypothesis. An idea is essentially of a conscious nature. To speak, therefore, of unconscious ideas, is to introduce into psychology the self-contradictory impossible concept of unconscious conscious ideas. This is equivalent to the assumption of an unconscious consciousness. An unconscious idea is neither a *vera causa* nor a fact ultimately to be verified. The conception of an unconscious idea is like the conception of a round square.

Moreover, it is not true, psychologically, that ideas can be "suppressed" so that they become dissociated or "unconscious." It is not true that we suppress painful ideas into the *"unconscious." We do not forget our painful ideas.* On the contrary, painful ideas stand out all the more prominent in our consciousness. *Pain hammers experience into the mind.* In fact we may say with more right that *it is the pleasurable ideas that are forgotten,* while *the painful ideas are remembered.* An experience associated with pain is never forgotten. Like a splinter in the flesh, it remains in consciousness. It is due to other causes that a painful experience becomes subconscious.

Teleologically, we can well see the importance of this fact. It would have been suicidal to the individual and ultimately to the species, if painful experiences were forgotten. The individual must learn to avoid harmful objects and hurtful stimuli. This can only be accomplished by actually *remembering* painful experiences. That individual would survive who remembered best his painful experiences. Were it otherwise, the individual would be very much in the condition of the proverbial silly bird that hides its head at the sight of the hunter. The subjective painful experiences must be remembered; a painful experience fixes the attention.

On this fact of strengthening memory by pain was based the once universally recognized method of training and education. What is fixed by pain is never forgotten. What may bring about forgetfulness is either a constitutionally bad memory, or a state of indifference, or an intense, paralyzing emotion of fear, especially in early childhood. *The whole theory of "suppression" of painful "complexes" is based on false clinical and psychological assumptions.* Neither is there such a process as "suppression of complexes," nor is there such a mental state as an "unconscious idea."

Bergson, who as usual has his hand everywhere, takes up cudgels in defense of the unconscious. In his work *"Matter and Memory"* he argues that common sense assumes the presence of external objects, although it may not be directly cognizant of them. Being an idealist and pan-psychist Bergson regards the nature of things as made up of images. If, then, he reasons, common sense believes in the existence of objects 'passed out of sight and sense,' if it affirms unhesitatingly the actual existence of not directly experienced *objective images,* there should be no difficulty in assuming the existence of subjective images, or of psychic states of which there is no consciousness. The argument is essentially metaphysical and will hardly have any weight with the psychologist or psychopathologist.

Bergson's psychology is unfortunately so much saturated with metaphysics that many a valuable suggestion becomes lost in the haze and tangle of his speculations. The psychologist has nothing to do with the constitution of matter as it is in itself. This belongs to metaphysical ontology. The psychologist assumes matter as an external existence, and separates it from his own subject matter,—psychic states, mental processes, their elements and relations. A psychic state made up of 'images' after the fashion of 'material images' with no consciousness to them ceases to be psychic in the psychological sense. From a psychological standpoint the term 'psychic' can only mean some form of consciousness, however vague and marginal. Bergson's view would have probably been nearer the truth, if he had assumed the existence of a *subconscious consciousness.*

An "unconscious idea" in the sense that the idea has no consciousness can have no meaning. If, however, by an "unconscious idea" is understood a *consciousness* of which the individual or personal self is not conscious, then we come around to a *subconscious consciousness*, as developed by me in my various works. A quotation from Höffding may bring out my point in a clearer and stronger light:

"The question before us is, whether the unconscious can be other than a purely negative concept. In daily speech (and more than is proper even in the scientific use of the language) we use such expressions as unconscious sensations, unconscious ideas, unconscious feeling. As, however, sensations, ideas and feelings are conscious elements, the expression is in reality absurd. If by an unconscious idea is meant the idea which I *have*, then the predicate "unconscious" signifies only that I do not think of or pay heed to the fact that I have it. This use of the word unconsciousness is connected with a twofold use of the word consciousness. It is used to denote not only the inner presentation of our sensations, ideas and feelings, but also self-consciousness, the attention especially directed to our sensations, ideas, and feelings. We have, of course, many sensations and ideas without being conscious that we have them, that is, without self-consciousness: many feelings and impulses stir within us, without our clearly apprehending their nature and direction. In this sense we speak, for example, of unconscious love. A man who has this feeling does not know what is astir in him; perhaps others see it, or he himself gradually discovers it; but he *has* the feeling, his conscious life is determined in a particular way."

In other words, what Höffding practically claims here is that there is no such mental state, no idea that is "unconscious," but that there are mental states, ideas, feelings, which, though conscious, do not reach self-consciousness. In other words, there are in us mental processes which have consciousness, but no self-consciousness. This is precisely what I mean by *the subconscious,—mental states which have consciousness, but do not reach the personal consciousness.* In short, the only possible psychological assumption is a *subconscious consciousness.*

CHAPTER XXIX

THE SUBCONSCIOUS, CONSCIOUS, AND UNCONSCIOUS

THOSE who accept the division of the subconscious into co-existing consciousness, or the co-conscious and the unconscious really assume the doctrine of the subconscious. They claim that it would be better and more precise to indicate whenever possible the conscious or unconscious, that is, the strictly physiological character of the observed manifestations. This, however, is more easily said than done. We know next to nothing of the physiological brain processes, which are mainly hypothetical, and we do not know the limits of the subconscious consciousness. In many cases it is not easy to determine what the exact character of the subconscious manifestation is, how far it is conscious, dimly conscious, how far it has gone toward the development of an independent personality, and how far it shades in the direction of the purely physiological. In the absence of any exact determination, the term 'subconscious' indicates the character of the mental state without any definite committal to any of the possible hypotheses.

The term "unconscious" is all the more objectionable, as Höffding has already pointed out, it is essentially an ambiguous, negative concept. The "unconscious" may mean absence of self-consciousness, or lack of consciousness, that is, purely physiological processes with no conscious concomitant. He who uses the term "unconscious" must in each case indicate in what sense he uses the term. Is the manifestation entirely physiological, or is it conscious in the sense of consciousness with no self-consciousness? The two meanings are diametrically opposed to each other. The unconscious in the sense of the purely physiological assumes the theory of unconscious cerebration; the other use of the unconscious in the sense of mere consciousness with no self-consciousness recognizes the view of the subconsciousness as advanced in my works.

It is claimed again that in many cases of psychopathic maladies there is no need to have recourse to subconscious systems. It is quite probable that the association between the stimulus and the emotion called forth is a direct one. The patient who is afraid of dogs has the fear called forth by the sight of a dog. There is no need to assume that there are here any intermediate links in the chain of association. Even physiological links may be totally absent here. It may be that by investigation it can be shown that this association has a history based on some former experience. There is no reason to assume that the experience is functioning subconsciously, whether consciously or "unconsciously," that is, physiologically. The dog and the fear have formed an indissoluble association, so that, as soon as the dog is perceived the fear is awakened.

This, however, is rather a debatable subject, since it is impossible to tell in the case of purely physiological links, whether such are present or not. Thus, Höffding says, "Not only may conscious results come from unconscious (subconscious) working up, but there may also be unconscious intermediate links in the midst of conscious work. Supposing the idea *a* to be linked with the idea *b*, and *b* again with *c*, then *a* will finally produce *c* directly without the intervention of b. The intermediate links are often so numerous that they cannot be recovered at all or with great difficulty. Many psychological paradoxes and sudden suggestions have their explanation in this unconscious determining of conscious ideas."

Wundt seems to maintain the same view: "The memory-process is especially predominant in those cases where the element of the new impression that gave rise to the assimilation is entirely suppressed by the other components of the image, so that the associative relation between the memory-idea and the impression may remain completely unnoticed. Such cases have been spoken of as 'mediate memories' or 'mediate associations.' Still, just as with 'mediate recognitions,' we are here, too, dealing with processes that are fundamentally the same as ordinary associations. Take, for example, the case of a person who, sitting in his room at evening, suddenly remembers, without any apparent reason, a landscape that he passed through many years before; examination shows that there happened to be in the room a fragrant flower which he saw for the first time in the landscape. The difference between this and an ordinary memory-process in which the connection of the new impression with an earlier experience is clearly recognized, obviously consisted in the fact that here the elements which recall the idea are pushed into the obscure background of consciousness. The not infrequent experience, commonly known as the 'spontaneous rise' of ideas, in which a memory-image suddenly appears in our mind without any assignable cause, is in all probability reducible in every case to such latent association." It appears, then, that both Höffding and

Wundt acknowledge the presence of intermediate links in what appears to be a case of purely "immediate" association.

In cases where the intermediate links are "unconscious," in the sense of a purely physiological process, there is no criterion to prove the presence of such intermediate physiological links, and one may as well, from a purely psychological introspective standpoint, deny their very existence. On the other hand, if with Wundt, Höffding and others we assume the presence of intermediate psychic links, there is no way of disproving them. It is quite probable that such intermediate links are present in every single case. The very fact that "unconscious" systems can be revived as memories or hallucinatory hypnoidic states would indicate their functioning when one of their components becomes awakened to activity.

As an objection to the presence of intermediate psychic links Pavlow's experiments are brought forward to show that associations can be formed between remote stimuli and glandular secretions, for instance. Thus, a dog with a fistula in the parotid gland can be made to react with secretions to light or sound stimuli.

This objection may be easily obviated by the consideration that we do not know whether there are or are not intermediate mental links between the artificial stimuli and the discharge of the glandular secretion. This consideration is all the more cogent as the remote stimuli can only give results, if persistently associated with food stimuli. If such association with food stimuli is absent, and new stimuli are associated with remote stimuli which give reactions through their associations with food stimuli, the result is *inhibition* of secretion.

In other words, each new stimulus must be directly associated with the original food stimulus.

To quote from Savadsky's work carried out in Pavlow's laboratory: "Wasiliev and Mishtovt were the first to investigate conditions of inhibitions. At first the authors had in mind to develop conditional reflexes, not on the basis of the unconditional reflex (*i. e.* food) but on the basis of another conditional reflex (such as a sound or light stimulus giving secretion.) Their experiments were as follows: From time to time they associated with the usual conditional stimulus another stimulus which had no relation whatever to salivary secretion, and this combination was not accompanied by the presence of the unconditional stimulus (food). By means of a great number of repetitions of such a combination, it was supposed to associate with the quality of the extraneous stimulus the quality of bringing about salivary secretion. It turned out, however, that such an arrangement of experimentation could by no means transform the extraneous agent into a conditional stimulus. In that way it became clear that the conditional stimulus, contrary to the unconditional, is not capable of communicating its property of bringing about salivary secretion. The fact is that the associative external stimulus, when accompanied by the unconditional stimulus alone, becomes after a few repetitions *a powerful inhibiting agent*."

This clearly shows that the conditional reflex in the dog can bring about salivary secretions only when associated with the unconditional reflex. What it means is, that the dog on seeing a light or hearing the sound *expects* food, and hence the psychic stimulation of his salivary glands resulting in secretion. Pavlow's experiments and also the experiments carried out under his directions by his pupils clearly prove that there is *no direct association between secretion and an external stimulus, such as light or sound, but that the secretion is brought about by an intermediate psychic link, namely the expectation of food.* Thus we find that the work of Pavlow and his pupils, far from showing the possibility of formation of direct associations, really goes to substantiate the view of the presence of intermediate mental links in cases of apparently immediate associations.

As a matter of fact there is no need for us to establish hypothetical, intermediate, unconscious or physiological links. The "unconscious" brain-processes are problematic entities and there is no way of getting at them. What we need to discover in cases of mediate association, and especially in cases of psychopathic diseases, is whether the intermediate links, or the original experience that brought about the trauma, or the state of dissociation is present, consciously, or subconsciously, or coconsciously. This is possible to test by hypnosis or by means of the hypnoidal state. In many such cases we actually find that the patient lives through the original experience either *consciously* in a hypnoidal state, or in a hypnoidic state, thus undergoing a mental experience which is immediately forgotten or dissociated; or what is more commonly the case, the patient lives through the original experience *subconsciously*. But, whether conscious or subconscious, the mental state is not "unconscious," but is essentially of a conscious character. In short, we deal here either with the personal consciousness or with the subconscious consciousness. Thus, all the facts of mental life, normal or abnormal, substantiate the presence of a *subconscious consciousness*.

CHAPTER XXX

THE THRESHOLD AND MENTAL SYSTEMS

IT may be well to point out some principles, important in many respects, but which at the present moment are of interest from a psychopathological standpoint.

Living tissue can only be set into activity by stimuli of certain minimal intensity; should the stimulus fall below that minimal intensity, the living protoplasm does not react. This holds true of all cells, from the lowest to the highest,—from the bacterium and infusorium to the highly differentiated cell, such as muscle cell, or neuron. The reaction of the living protoplasm to the stimulus shows the irritability or sensitivity of the cell. This sensitivity has its physiological threshold, so that a stimulus falling below a certain intensity cannot call forth any reaction in the cell. The rise or fall of the threshold would mean an increase or decrease of the minimal intensity of the stimulus requisite to bring about a cellular reaction. By varying the conditions of sensitivity, such as mechanical, thermal, electrical, chemical and nutritional, the physiological threshold can be raised or lowered.

The same holds true of a whole psycho-physiological system,—there is a threshold of sensitivity below which the minimal stimulus cannot fall, the latter does not awaken any reaction in the system. All the senses reveal the presence of such thresholds which are also present in the case of all the higher psycho-physiological systems. If we term the stimulus which can just bring about a reaction in the system the stimulus threshold, we can say that a given system can only be thrown into activity by a stimulus rising in intensity above the stimulus threshold. Intensity of stimulus, then, is an indispensable condition of the functioning of a psycho-physiological system.

In highly differentiated cells, however, it is not only the quantity, or intensity of the stimulus that is to be considered, but also the quality. The visual sense organ is not affected by auditory stimuli nor can the auditory sense organ be affected by visual stimulations. Similarly, in the functioning of the higher psycho-physiological systems the quality of the stimulus should not be overlooked. Systems that remain inactive under one set of stimuli, however intense, will respond to another set of a different quality.

The same holds true of that synthesis of mental systems which we term moment consciousness, and which we shall treat in detail further on. To set the moment into activity, the moment threshold must be passed, and not only the intensity of the stimulations should be taken into consideration, but also the qualitative aspect of the stimuli. Ideas, emotion and feelings which apparently remain dormant at the action of one set of excitations will respond readily to the action of excitations of a different nature. Habits, habitual movements, habitual thought, depend entirely on the qualitative character of the excitations, on the combinations of special objects, circumstances and times. The quality of the stimulus is one of the important factors in the activity of a psychophysiological system, or of a moment consciousness.

Besides those two factors of intensity and quality, another factor, that of inhibition, plays quite a rôle in the variations of the threshold. We are acquainted with inhibitions in physiology, such, for instance, as the inhibitions exercised by the pneumogastric nerve on the heart, or the arresting of the activity of glands or of the peristalsis by the stimulation of afferent nerves. We know also of central inhibitions, such as fear, distress, pain, acting as so many inhibitions on the peripheral organs and serving to arrest functioning activity. Similarly in mental life, complex as it is, the highly organized psycho-physiological systems, with their concomitant moments consciousness, still fall under the same general physiological laws of inhibition. In the course of associative activity systems become organized into complex groups, into complicated systems or constellations of systems which, to maintain their functioning equilibrium, keep one another in check or under inhibition.

Such a formation of checks and inhibitions is just what takes place in the training and the education of the individual and the race. Every psycho-physiological system or moment entering into relations with other systems and moments is bound in the course of its associative activity to form inhibitions to its function by the direct influence of external or internal excitations. In other words, there is a rise of threshold due to inhibitory associations.

Inhibition and rise of threshold may also result in a different way in the process of association. We may possibly lay it down as a law, which plays no small rôle in the interaction of systems and moments, that in a series of aggregation of various systems or moments, forming a more complex organized whole, due to association and synthesis of the component systems, having various thresholds, the ones having the higher thresholds will raise the thresholds of the moments having a greater sensitivity. This, however, may be counterbalanced by the lowering of the moment threshold by associations with moments of great sensitivity, that is, with low moment thresholds.

While on the one hand the inhibitions and the consequent rise of threshold go along with the complexity of systemic structure as well as with the increase of associative activity, both in extension and intension, there is at the same time an advantage gained for the system, inasmuch as it really has now more chances to become active, on account of the greater number of systems with which it has become associated. The threshold of the associated system rises, but on the other hand, the chances for activity increase, while the liberation or discharge of energy with the consequent evil effects of extreme fatigue, exhaustion and ill nutrition is checked and guarded against by the inhibitions and the rise of threshold.

What happens now when a psycho-physiological system becomes dissociated? The inhibitions become removed and the threshold falls. The system is no longer checked by inhibitions or by other systems, and hence, with a lowering of the threshold, becomes sensitive, reacting to any slight, passing stimulus, manifesting or liberating all the energy it possesses until fatigue and complete exhaustion set in. From this vantage ground we can understand the fact of the extraordinary energy which the dissociated subconscious systems manifest, so much so that the unusual energy appears almost supernatural, and has on that account been ascribed by the superstitious to diabolical possession.

To quote from a former work of mine:

"When a system present in the upper personal consciousness is to be disintegrated, the suggestion given should be kept out of the patient's personal memory. One can observe this fact clearly in post-hypnotic suggestions. If a post-hypnotic suggestion is fully remembered, it usually miscarries,—the suggestion loses its efficacy, and often comes up as a word-memory without the stringency of realization. When, however, amnesia is enforced, the post-hypnotic suggestion is fully realized. A dissociated system present in the subconscious, when coming to the surface of the upper strata of consciousness, becomes manifested with intense sensori-motor energy. *Dissociation gives rise to greater dynamogenesis.* This principle of dynamogenesis is important; cases of so-called impulsive insanities and 'psychic epilepsy' are really due to this cause.

"A system entering into association with other systems is set into activity, not only directly by its own appropriate stimuli, but also indirectly through the activities of the various systems associated with it. These associative interrelations bring about an equable and normal functioning activity, controlled and regulated by the whole mass of associated systems. The mass of associated systems forms the 'reductives' of each individual system. In dissociated systems the controlling influence of the 'reductive mass' is lost and the result is an over-activity, unchecked by any counteracting tendencies.

"This relation of *dissociation* and *dynamogenesis* is closely related to *periodicity* of function, with its concomitant manifestation of psychomotor activity characteristic of all passions and periodically appearing instincts. Dissociated systems present impulsiveness, because of lack of associated counteracting systems. The only way to diminish the overpowering impulsiveness with which the dissociated subconscious systems make an onset in their rush into the personal consciousness is to bring about an association with counterbalancing or inhibitory, controlling, conscious systems, to work the dissociate systems into the tissue of the personal, controlling consciousness which has to be fortified and developed.

"Physiologically, it may be said that a neuron aggregate, entering into association with other aggregates and being called into activity from as many different directions as there are aggregates in the associated cluster, has its neuron energy kept within the limits of the physiological level. A dissociated neuron aggregate, on the contrary, is not affected by the activity of other aggregates; it is rarely called upon to function and stores up a great amount of neuron energy. When now an appropriate stimulus liberates the accustomed energy, the activity is overwhelming, and is very much like the eruption of an underground volcano, giving rise to temporary attacks, to 'seizures' by subconscious states of the whole field of the upper consciousness,—'seizures' which, being really of the nature of post-hypnotic automatisms, are generally mistaken for epilepsy, the attacks being regarded as epileptic manifestations, as 'larval epilepsy,' as 'epileptic equivalents,' as 'psychic epilepsy.' With the restoration of the equilibrium of the neuron aggregate, with the synthesis of the associated systems, a synthesis which can be brought about by different methods, the subconscious eruptions, the attacks, or 'seizures' vanish, never to return."

CHAPTER XXXI

THE PRINCIPLE OF RESERVE ENERGY

WE have pointed out the significance of inhibitions in keeping back the systemic neuron energy from fully being discharged under normal conditions of life, and we have also shown that the removal of inhibitions results in the full liberation of the accumulated neuron energy. This fact, so striking in the domain of recurrent psychomotor states, almost forces itself on the attention of the student of abnormal psychology. From such a fundamental fact of abnormal mental phenomena, we may draw some conclusions in regard to mental life in general. For, after all, the laws of pathology do not differ from those of physiology in general, the pathological really being the physiological under special conditions. The normal is either the usual, the habitual, the customary, or is, at best, an ideal construction of the variations of life more or less successfully adjusted to the conditions of the external environment.

This adjustment, however, keeps on constantly shifting ground, continually changing the relative position of the normal and the abnormal. From this standpoint pathology is of the utmost importance in the study of organic life. The pathological being the normal out of place, the abnormal being the normal under special conditions, pathology that deals with the abnormal gives us a deep insight into the general laws of normal physiological activity. All the experiments in physiology consist practically in the production of so many pathological conditions and states. When the physiologist makes injections, sections and stimulations by various agencies, what else does he effect if not the production of the pathological, in order to learn the physiological action of the various tissues and organs? In psychopathological studies we follow the interrelations of mental phenomena under special conditions; it is the physiological method of experimentation by production of pathological variations; the conclusion arrived at in psychopathology should apply to mental life in general. What is this conclusion? It is the principle of potential subconscious energy or, more briefly stated, *the principle of reserve energy.**

The moment thresholds of our moment consciousness, or, put in physiological terms, the thresholds of our psycho-physiological systems, are usually raised, mental activity working in the course of its development and growth of associative processes under ever-increasing inhibitions with ever-higher thresholds. It is enough to compare the educated, the civilized, with the uneducated or with the barbarian and the savage, to realize the truth of our statement. On account of the threshold and inhibitions, not the whole of the psycho-physiological energy possessed by the system or moment is manifested; in fact, but a very small portion is displayed in response to stimuli coming from the habitual environment. What becomes of the rest of unused energy? *It is stored, reserve energy.*

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*When this principle was formulated by me in a series of articles published in The Boston Medical and Surgical Journal for March and April, 1907, James sent me his article, "The Energies of Men," in which he developed a similar point of view, though on widely different lines. Nothing gives me more pleasure than to find myself in accord with the great American psychologist and philosopher.

Biologically regarded, we can well see the importance of such stored or reserve energy. In the struggle for existence, the organism whose energies are economically used and well guarded against waste will meet with better success in the process of survival of the fittest, or will have better chances in the process of natural selection. The high thresholds and inhibitions will prevent hasty and harmful reactions as well as useless waste of energy, unnecessary fatigue, and states of helpless exhaustion. Moreover, natural selection will favor organisms with ever greater stores of reserve energy which could be put forth under critical conditions of life. In fact, the higher the organization of the individual, the more varied and complex the external environment, the more valuable and even indispensable will such a store of reserve energy prove to be.

The course of civilization and education, by continuously raising the thresholds and inhibitions, follows the line of natural selection, and keeps on increasing the disposable store of potential subconscious or reserve energy, both in the individual and the race. It is in this formation of an ever-greater and richer store of disposable, but well-guarded, reserve energy, that lies the superiority of the educated over the uneducated, and the supremacy of the higher over the lower races.

Civilization and education are processes of economy of psycho-neural force, savings of mental energy. But what society is doing in a feeble way, natural selection has done far more effectively. What education and civilization are doing now on a small scale and for a brief period of time the process of survival of the fittest in the ever-raging struggle for existence has done for ages on a large scale. We should, therefore, expect that the natural reserve energy would far exceed that of the cultivated one. The brain and mind of the ancient German differed in nothing from his modern descendant, the German philosopher, and still what a difference in the manifestation of mental energy! The savage brain and mind do not differ from those of their civilized descendants, and still what an ocean of mental life separates the civilized man from his savage progenitor!

It is against the evidence of biological sciences to suppose that the acquisitions of the cultivated brains have actually been transmitted from generation to generation. It is not likely that acquired characteristics brought about by social life will change so radically the brain in the course of some forty or fifty generations that separate the civilized man from his savage progenitor; and the trend of biological evidence hardly favors the transmission of such acquired characteristics.

"There sits the savage," once exclaimed a friend of mine, an eminent neuro-pathologist, "with three quarters of his brain unused." Yes, there sits the savage with a brain far surpassing the needs of his environment, harboring powers of a Socrates, Plato, Aristotle, of a Shakespeare, Goethe, Darwin, and Newton. The ancient German and Briton hardly differed in their mental powers from their contemporaries, the civilized Egyptian and Babylonian. What, then did those Aryan savages do with their richly endowed mental energies? Nothing. The mental energy was lying fallow,—it was reserve energy,—energy for future use, for the use of future ages of coming civilization.

But what about the cultivated man? Does he suffer from neurasthenia, from nervous impotence, because, as some would have it, on account of the strain of civilized life he has exhausted his store of nervous energy? One may well ponder over the significant fact that it is *the neurasthenic, the "psychasthenic" who is doing the world's work.* We must remember that civilization is but of yesterday, and that the reserve energy is hardly touched upon.

In the treatment of the phenomena of psycho-physiological dissociation, in the protean symptoms of nervous and mental exhaustion, we should not forget this biological principle of reserve energy, and should make attempts to use it. In many cases the inhibitions become too heavy and the thresholds too high. *We must loosen the grip of some of the inhibitions and lower the thresholds, thus utilizing a fresh supply of reserve energy.*

The treatment of psychopathic diseases should be based on this biological principle of dormant reserve energy. In many cases the inhibitions become too heavy and the threshold too high. We must loosen the grip of the inhibitions and lower the thresholds, utilizing a fresh supply of dormant reserve energy.*

A similar train of thought was developed by Dr. S. J. Meltzer, in his excellent paper on "The Factors of Safety in Animal Structure and Animal Economy." By a striking series of instructive facts, Dr. Meltzer points out that "all organs of the body are built on the plan of superabundance of structure and energy." I cannot resist the temptation of quoting Dr. Meltzer's conclu-

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*The principle of reserve energy is of great importance in education. I hope to work out this subject elsewhere. I have also shown the importance of the principle of reserve energy in my work *The Psychology of Laughter.*

sions at some length, because they so clearly elucidate our principle of reserve energy, which is all the more valuable, as Dr. Meltzer has formulated it independently on widely different grounds. "Of the supplies of energy to the animal, we see that oxygen is luxuriously supplied. The supply of carbohydrates and fats is apparently large enough to keep up a steady luxurious surplus. . . . The liberal ingestion of proteid might be another instance of the principle of abundance ruling the structure and energies of the animal body. There is, however, a theory that in just this single instance the *minimum* is meant by nature to be also the *optimum*. But it is a theory for the support of which there is not a single fact. On the contrary, some facts seem to indicate that Nature meant differently. Such facts are, for instance, the abundance of proteolytic enzymes in the digestive canal and the great capacity of the canal for absorption of proteids. Then there is the fact that proteid material is stored away for use in emergencies just as carbohydrates and fats are stored away. In starvation, nitrogenous products continue to be eliminated in the urine, which, according to Folin, are derived from exogenous sources, that is, from ingested proteid and not from broken-down organ tissues. An interesting example of storing away of proteid for future use is seen in the muscles of the salmon before they leave the sea for the river to spawn. According to Mescher the muscles are then large and the reproductive organs are small. In the river where the animals have to starve, the reproductive organs become large, while the muscles waste away. Here, in time of affluence, the muscles store up nutritive material for the purpose of maintaining the life of the animal during starvation and of assisting in the function of reproduction. This instance seems to be quite a good illustration of the rôle which the factor of safety plays also in the function of the supply of the body with proteid food. The storing away of proteid, like the storing away of glycogen and fat, for the use in expected and unexpected exceptional conditions, is exactly like the superabundance of tissue in an organ of animal or like an extra beam in the support of a building or a bridge—a factor of safety.

"It seems to me that the factors of safety have an important place in the process of natural selection. Those species which are provided with an abundance of useful structure and energy, and are prepared to meet many emergencies, are best fitted to survive in the struggle for existence."

Unusual combinations of circumstances, great radical changes of the environment, often unloosen the inhibitions, and, overstepping, or lowering the thresholds, release some of the reserve energy. Critical periods, great dangers, wars, revolutions, often make man rise to the occasion, so that apparently insignificant and worthless individuals display an energy unforeseen and unsuspected, and which makes of them heroes and heroines. There is a rise in intensity and a qualitative change in the stimuli, an unloosening of some of the inhibitions with a consequent release of some of the bound-up reserve energy.

In this respect wars and revolutions may be regarded as important factors in the manifestation of human potential energy. The Persian and Peloponnesian wars unloosened some of the energies of Greece, giving rise to great thinkers, scientists, and artists, having a lasting influence on the destiny of humanity. The constant wars and national misfortunes of the Jews released their reserve energy making of them a race of prophets, apostles and martyrs, deeply affecting the course of human civilization. The wars of the Reformation open a new era of free development of modern European civilization. The English, American, and French revolutions have released new supplies of energies and have opened a new arena for the free development of political, social, and industrial forces. In our own times we meet with the example of the Japanese, who, under the strain of great national danger, have released a reserve energy unsuspected in races of the Mongolian stock.

Reserve energy becomes manifested under the influence of radical changes in the environment, just as we have found that psycho-physiological systems react and start into function under the influence of special conditions and special appropriate qualitative stimuli. In the study of functional nervous and mental diseases, in the study of neurasthenia, or psychasthenia, hysteria, and insistent or recurrent mental states, one becomes more and more impressed with the fact that beyond the psycho-physiological limits of energy, available for the habitual adjustments to the ordinary external conditions of life, there is a vast store of reserve energy whose depths one cannot gauge.

Aus dem Kelche dieses Geisterreiches
Schäumt ihm seine Unendlichkeit.

PART II

THE THEORY OF THE MOMENT CONSCIOUSNESS

CHAPTER I

THE MOMENT CONSCIOUSNESS

WE must try to realize the precise meaning of the "moment consciousness," as a clear comprehension of it is of the utmost importance to psychology in general and to psychopathology in particular.

In a former work I pointed out that "consciousness is not uniform, that of the infant differs from that of the adult; the consciousness of the brute differs from that of the man, and still they all belong to the genus consciousness." I also insisted on the fact that there is a confusion in the use of the term "consciousness," a confusion which almost amounts to what I may term as "the psychologist's fallacy." The fully developed type of consciousness characteristic of the adult human mind, namely, self-consciousness, is substituted for the lower forms, or for types of consciousness characteristic of the lower animals. The psychologist, and, especially the physiologist, when writing on psychological matters is apt, to substitute, either on account of the introspective method used or on account of lack of discrimination, the type of consciousness of the observer, namely, self-consciousness.

No biologist, not even Loeb, will accept unrestrictedly the Cartesian view that consciousness, or the soul, or mind is the privilege of man alone, while all other animals have no soul, no mind, no consciousness, they are complex reflex mechanisms, highly developed automata with no psychic life to them. We must allow the fact that other animals lower than man in the rungs of development possess some form of psychic life. The horse, the dog, the cat, the cow, the ant, the bee, and other animals have some form, however varied, of psychophysiological activity, some form of mental life, however different in type from that of man. Abnormal psychology discloses to us dissolving views of human consciousness, such as found in the various forms of insanity and in the various manifestations of psychopathic states, presenting conditions of all stages of dissociation and disaggregation of consciousness. Psychic life is by no means uniform, there are many types of consciousness.

We have pointed out above that synthetic unity is the essence of consciousness. Consciousness is not an association of independently existing ideas, images, feelings, and sensations. Mental events must form a unity, a synthesis in the total psychic life of some psycho-biological organization. Disconnected words of a sentence thought by a series of thinkers do not give rise to that unified mental process which goes to form the psychic experience of the meaning of the sentence. The words must be cognized by the consciousness of *one* psychobiological organism. Ideas, images, feelings, emotions, volitions do not meet on independent ground, associate, fuse and go to to form a unity, a new idea or feeling. Experiences in different minds do not combine and associate to form a new synthesis. Even the associationist tacitly implies that the various associations of ideas and feelings take place in some *one mind.*

In order to get some form of cognizance or some form of experience of sensations and ideas there must be some one organic consciousness that experiences or lives through the psychic events. Thoughts, feelings, ideas, images, and sensations are occurrences in some one psychic individuality, a psycho-biological or psycho-physiological organism, an organism which possesses the living synthetic unity of consciousness. From a purely psychological standpoint we may term this living organic unity of consciousness—a subject. I use the term "moment-consciousness," or simply "moment" to indicate this synthetic unity of consciousness which constitutes the characteristic of the subject having the synthesis of mental experiences. This holds true of all psychic life, from the very lowest representative of mental life to the very highest, such as the self-consciousness of man.

The subject, or the unity of the psycho-physiological individuality cannot be represented by a series, whether temporal or spatial, as a series ceases to be a unity, or a synthesis. For a series of independent events remains a series, while the synthesis or unity of the series is a superadded event. A series of psychic events must exist *in* and *for* some psychic unity or individuality which stands for the organic unity of consciousness, or for the synthesis of consciousness, no matter what the type of consciousness is, low or high, animal or human. This synthetic unity of consciounsess, no longer a series, is indicated by the term "moment" or "moment consciousness." There are various types of moment consciousness, according as there are various forms or types of synthesis.

Psychic contents or states of consciousness are always found in connection with some individuality. That piece of bread lying yonder may awaken hundreds of mental states under different conditions and in various organizations. My friend sitting by my side sees it, so do I, and so does the child, so does the bird in the cage, so does the dog, and so possibly does the fly flitting around the table. The states awakened are no doubt different, but they are of a psychic character none the less. My friend and I may be conscious of the personal element along with it. We may think it in the form of ownership; "It is who thinks, who has the thought of the bread;" but this is only one of the many forms under which the perception or thought of the bread may appear. One thing, however, is essential to all the states, different as they may be in their content, and that is the fact that they belong to some one individuality which under certain special conditions may also be of the nature of a personality. The individuality may be of a high or of a very low type, it may be that of a man or it may be that of a fly, but it must be some *one* conscious being that synthetizes the psychic state. It is this *one* synthetizing consciousness that constitutes the essence of what we term "moment consciousness."

The moment consciousness is the subject, the psychobiological individuality, requisite in all psychic activity. The psychic individuality cannot be regarded as a series of independent physical events. For it may be asked, for whom does that series exist and to whom is it presented? A synthetizing moment consciousness, both subject and content, is a fundamental assumption of psychology, just as space is that of geometry, and matter and force that of physics and chemistry. This necessity of assuming a synthetizing moment consciousness becomes clearly manifested in the highest form of psychic activity, such as self-consciousness. For if self-consciousness be reduced to a series, it may be pertinently asked with John Stuart Mill, "How can a series be aware of itself as a series?"

A moment consciousness must not be considered as something apart from its content; it does not exist by itself; it exists wherever and whenever psychic states are synthetized; it is the synthetized psychic material; mere synthesis without material is meaningless. On the whole, we may say that the moment consciousness is like an organism, it forms a whole of many constituent parts.

In the moment consciousness we find psychic material synthetized round one inmost central event which in its turn may have a central point. It reminds one strongly of the cell; although it branches out in all directions, it has always its inmost central point, its nucleus, nucleolus, and nucleolinus. While I am sitting here writing, I take in the many impressions coming to me: The sunshine pouring through the window, the table, the ticking of the clock, the chair, the bookcase, and many other things in the room; all of them are formed and synthetized into one, and as such they form a moment consciousness.

They are not, however, indifferently grouped; their unity is an organized whole with a center, with a vital point, so to say. At the heart of the synthetized whole there is a central point, the grouping around which constitutes the individuality of the particular moment consciousness. In my own case, the central interesting point is the paper on which I write the sentence just formulated, and is the inmost point, the principal idea under discussion which forms the nucleolinus, so to say, of the whole moment consciousness. The most interesting or the most important experience forms the center of the moment.

The same object which seemingly gives the same experience assumes different meanings and is therefore really quite a different experience, according to the moment consciousness in which the perception or knowledge of that object is synthetized. These presently experienced states, synthetized within the moment, form the matter, or what we may term the content of the moment consciousness. The moment of consciousness will change with the changes of the synthetized content. As an official, I am now in my office doing my work, and the different experiences form one whole, an association of experiences, systematized and synthetized into an organic unity. As a family man, I am at home enjoying the company of my wife, children, and friends, and once more the experiences are organized into the unity of a moment consciousness. Now I am climbing mountains and stand on the slippery edge of a precipice, now I enjoy a conversation with the child I love, now I take part in the excitement of the political arena, now I sit on the bench of the jury listening gravely to the cross-examination of witnesses in a murder case; all these are nuclei for the formation of different moments. All of these depend on the different central experiences that form the kernel for the moment consciousness.

The central experience, round which all other experiences are grouped and synthetized, forms, so to say, the very essence of the given moment consciousness, and as long as this central experience remains unchanged in its position the new experiences are assimilated within the same moment consciousness. The moment consciousness, therefore, does not vary with the change of the content, if only the assimilating nucleus remains invariable. Should, however, the content vary so that the central experience is transposed and some other one occupies its place, then the moment consciousness itself is changed. In fact, we may have the content of the moment consciousness entirely unchanged; but if the central experience alone is displaced from its position, then the moment consciousness itself becomes changed in its nature. Thus, if as a traveller I climb the mountains chiefly for the sake of pleasure, and keep the scientific and aesthetic aspects in the background, the moment consciousness will be entirely different from the one where the scientific or aesthetic aspects are in the foreground, and all other considerations in the background. *The moment consciousness, we may say, is entirely determined by the leading central experience.*

The content of the moment consciousness, however, is not confined to the presently experienced psychic states only; it embraces the past, it includes memory, that is, it synthetizes outlived moments. In my present capacity of physician and working in the office, I may also include the experiences as traveller, as juror, as teacher, as companion, and as lover, but still the tone of this particular moment consciousness is given by the duties of my present occupation. The most vivid, interesting, and leading experiences form in this synthesis the nucleus round which all other experiences are crystallized and synthetized into one organic whole. We have here a series of moments, all of them being coördinated and contained in one synthesis of one moment consciousness.

The members of this synthetized series are not of equal value nor are they qualitatively the same.

The leading experience that constitutes the assimilating element of the given moment has reality, interest, and value, while others are only so much material support for the principal central experience. This central experience differs also from the other experiences synthetized in the moment consciousness by the fact that it alone, that is, the nucleus only, has the most vivid psychic states, sensational and perceptual elements, while the others may totally lack them. Other subsiduary synthetized moments are rather of an ideational character; they are what is called "reproductions," ideal representatives of formerly experienced, outlived moments.

The moment consciousness may contain moments that happened to emerge by the dynamic process of association, such as contiguity, similarity, or contrast. Each moment consciousness may become content for the next. Each successive moment consciousness may synthetize the preceding ones, contain them in an abridged ideational form, and may, moreover, recognize and claim them as belonging to itself, and as being one with them. There may, in short, be various forms of mental unification, but one thing stands out clear and that is the nature of the moment consciousness. The essence of the moment consciousness is *mental synthesis.*

If we take a cross section of the moment consciousness, and try to fixate it with our mental eye, we find a central psychic element round which other psychic elements are crystallized. This central psychic element is prominent, vivid, forms, so to say, the vital point of all the states and gives the tone to the rest, forming a whole, one organized experience. The psychic matter that surrounds the luminous central point does not stand in a free, more or less disconnected relation to the latter, it is intimately related to the centre, and cannot be separated without destroying the moment as a whole and even the life existence of each particular constituent. The whole moment seems to form an organic network in which the other elements take their place, according to a plan.

The structure of the moment may in this respect be compared to that of the cell. In the cell we discriminate the nucleus round which the protoplasm is grouped. The protoplasm is connected with the nucleus by a network, a cytoreticulum. The destruction of the nucleus affects the protoplasm and the destruction of the protoplasm affects the nucleus. The two are intimately, organically interrelated by the common network, the general plan of their organization.

A concrete example will perhaps best answer our purpose. Suppose the moment is perceptual and consists only of one percept. Now in the percept we find a central sensory element surrounded by other elements. This central element stands out prominently in the given psychic state, while the other elements are subordinate. Not that those elements are unimportant for the percept, on the contrary they are of the highest consequence and moment, they only lie outside the focus of the psychosis. Along with the focus those elements form one organized whole. The intensity of the psychic state proceeds from the periphery to the centre. The elements can as little be separated from the central element as the area of the circle from its centre. By removing the centre the circle will be destroyed and the centre will cease to be what it is. All the elements of the percept form one texture having the central sensory element as its nucleus.

Integrated as all those elements are they are not, however, of equal value and importance for the life existence of the whole. The central sensory element is of the utmost consequence, it is the vital point of the whole experience. While the change or destruction of one or some of the subordinate elements may still leave the total moment unchanged, or but slightly modified, a change of the central sensory element or of the nucleus will profoundly modify all the other elements and their interrelation; and a destruction of the nucleus will destroy the total moment. Like their neuron counterparts, the moments may be regarded as being organized into groups, systems, communities and constellations, aggregates of greater and greater complexity.

CHAPTER II

TYPES OF MOMENTS AND MOMENT-THRESHOLD

WE may discriminate the following types of moment-consciousness:

I. The Desultory Moment.
  (a) The Absolute,
  (b) The Relative, or Reflex Moment.
II. The Synthetic Moment.
  (a) The Simple Accumulative,
  (b) The Compound Accumulative.
III. The Recognitive Moment.
  (a) The Synthetic, or Generic Recognitive,
  (b) The Specific, the Reflective, or the Synthetic Moment of Self-consciousness.

The chief characteristic of the desultory moment is the lack of interconnection of the links of the psychic series. Each pulse of psychosis stands out as an isolated fact without "before" and "after." A moment of such a character has no reproduction, no recognition, no memory, and certainly no personality. The lower stages of this moment, the absolute desultory moment-consciousness are mere moment-content devoid of all organization and substance. The higher forms of the desultory moment, those of the reflex moment-consciousness, have an elementary organization, but of such a fixed character that the series of manifestations, or of functioning remain completely isolated. Reproductions appear here for the first time in an elementary form, inasmuch as the recurrences of the moment leave the latter unmodified; it is reproduction only on account of the modifications produced in a higher observing moment.

This moment has the germs of reproduction, but no recognition and hence no memory, no self-consciousness. The moment of the absolute desultory type may possibly be found in unorganized protoplasm and in the lowest forms of the protozoa. The higher forms of moment of the desultory type, the reflex moment, may be found in the lower forms of lowly organized life and in the lower structures of the higher metazoa.

The moment-consciousness of the synthetic type has its series of links interconnected. In each link the preceding ones are synthetized. The recurrence of this type of moment, unlike the moment of relative desultory consciousness, is embodied in the structure and function of the moment. It is in this type of moment that reproduction is for the first time clearly and fully manifested. The moment is modified with each reproduction; it accumulates more content with each recurrence and, as such, the synthetic moment may also be characterized as *accumulative*.

This type of moment has reproduction, and the reproduction is not only for the external observer, but is present and inherent through changes in the organization, structure and function of the moment itself. Memory first appears in this type, but it is rather organic, not recognitive in nature.

The more elementary form of this type of moment shows accumulations only along single lines of development. The lines remain disconnected. Sensory nuclei surrounded by secondary sensory elements do not occur, and perceptual psychosis characteristic of the higher forms is absent in this stage of the synthetic moment, which is therefore termed *the simple accumulative moment of synthetic consciousness.* It is only in the higher forms of synthetic consciousness, in the *compound synthetic moment* that perceptual life may be said to arise.

In the compound synthetic moment, series along diverse lines become severally compounded and sensory nuclei with secondary sensory elements make their appearance. But even here recognition is not present and hence memory may from a subjective standpoint be regarded as absent. The synthetic moment even in its highest phase of development lacks ideational life and is entirely devoid of self-consciousness. The higher invertebrates and the lower vertebrates probably do not rise in their psychological development above the higher form of synthetic consciousness, the compound synthetic moment.

In the recognitive moment the series of reproductions are intimately connected as we find the case to be in the synthetic moment. The moment becomes modified with each occurring reproduction, containing in an abridged form the history of previous modifications. The mode of reproduction of the recognitive moment, however, differs widely from that of the synthetic moment. The content of the previous occurrence need not be actually reproduced, but only represented and any psychic element may fulfill this function of representation. It is through such representation that the reproduction of this type of moment is effected. Through representation the moment reproduces form and content, and cognizes over again immediately what it has just experienced, in short, it *re-cognizes*.

Recognition is the function of representation and is the essential characteristic of this type of moment-consciousness. Ideational psychosis germinates and develops with the growth of the recognitive moment. For the very function of the idea is the cognition over again of what has been cognized in perception, in short, recognition is the essence of the idea.

In generic recognition the time element is absent or but vaguely present. In perceiving the table yonder we also recognize it as table by classing the percept table with representations derived from previously perceived tables, but hardly does any time-element enter into this form of recognition, the idea of having generic recognition does not refer to any percept experienced at some definite point of time. The recognitive moment uses the idea as a means to reproduce its former experience without actually living them over again. The representation in the lower form of moment is so bound up with the percept that the function of recognition is but implicit, and becomes explicit in the higher forms, when the ideational or representative elements become completely free and appear in mental trains, or in series of associated ideas.

In its specific form, however, the recognitive moment also includes the time element. The moment-content or object generically recognized is classed or combined with a definite representation generically referring to perceptual experience; specifically recognized, the content or object is placed in a definite point of the objective schema of the flowing time series. The particular rose thought of now is the particular rose seen before, say yesterday. The idea of the rose substitutes and represents the percept and has the function of the percept as reproduced, thus referring to the same object. That is why the qualitatively different representation is identified with the actual perception. What is common to the two is their reference to the same object, in all else they really differ widely. The recognitive moment that lacks the time-element is termed *generic,* while the moment that has time element included in the process of its recognition is termed *specific recognitive moment-consciousness.*

In the lower and simpler stages of the recognitive moment the generic form predominates, in the higher and more complex stages the specific form of recognition arises and attains its full development. From a biological standpoint one can understand the importance and immense advantage in the struggle for existence of those organisms whose moment-consciousness has varied in the direction of representation and has begun to reproduce after the mode of the recognitive type. To effect a modification and new adaptation to changes in the environment the moments of the desultory type have no other mode of modification but by the slowly working factors of spontaneous variations and natural selection, a process of adaptation and useful modification prolonged throughout the course of generations. The adaptations of the different forms of the synthetic type are greatly facilitated, and the course of the process is so much foreshortened that it becomes reduced to the life-existence of the given individual organisms. The adaptations are brought about by the slow process of chance success and error, and the whole series of modifications must be fully and directly undergone by the organism.

The recognitive moments have reduced the time-elements of adaptations to changes of conditions in the external environment almost to a *minimum*, the series of reactions in the growth to most perfect adaptations is effected in representation, saving itself the necessity of actually undergoing a series of intervening modifications. Representative elements, being free, can enter into different modes of combinations, and thus form adjustments and adaptations with an ease of which the primary and secondary sensory elements of the lower moments do not admit. This freedom of movement in the formation of new representative combinations is an important factor in organic life, as it gives the organism that possesses this variation an advantage in the struggle for existence. Adaptation can be made for the future from the experiences of the past.

In those forms of the recognitive moment in which the time-element plays a part in the determination of the whole there is always present a specific time-localization of the given psychic or moment content. Where the form of recognition is specific the representation or idea is regarded as actual and localized in some definite point in the stream of past time, where the recognition is generic the representation or idea is referred to no definite point in the stream of objective time, and when present in the highest types of moments, is regarded as belonging to what is termed imagination. Recognition determines the place of the given experience in the series of events.

In the lower stages of the recognitive moment no time element is present, in the higher stages some vague reference to time may be present in the forms of specific recognition, but definite localization appears only with the rise of the recognitive moment of self-consciousness. With the appearance of the conceptual schema of objective time the specific form of recognition refers not only to a definite point on the scale of objective time, but to a definite mental synthesis localized on that objective time-schema; in other words, the self-concept is involved in specific recognition, which therefore belongs to the highest form of the recognitive moment, namely, the moment of self-consciousness or of personality.

In specific recognition the present self projects the bit of representative experience into the past self which is felt to be identical with the former in the series of selves to which the reproduction of the moment gives rise. The highest recognitive moment, or moment of self-consciousness may be represented as a series of selves projected in the time schema the preceding selves being synthetized by each succeeding self. From this standpoint we may regard such a moment as synthetic and term it *the synthetic moment of self-consciousness.*

Should this series of reproductions constituting the history of the moment become dissociated and isolated through mental degradation and degeneration, then the form of consciousness becomes analogous to the desultory consciousness and may therefore be termed *the desultory moment of self-consciousness.*

The functioning moments of a highly organized psychic being, at any point of time, present a hierarchy of moments differing not only in degree of consciousness, but also in the type of structure and function. Moments-consciousness from the lowest to the highest, from the simplest to the most complex, from the desultory type to the recognitive type of self-consciousness all are present in the adult stage of the most highly organized psychic life. Now in the series of moments going to form such a highly complex being, those that are of the recognitive type can become focal, while those that belong to the lower types can never enter the focus. The lower types of moment-consciousness, belonging to the groups and systems of reflex and instinctive activity, cannot, from their very nature, reach that level of consciousness and that degree of psychosis as to become qualified to enter into the focus of the moment of self-consciousness.

From this standpoint, then, the subconscious may be divided into two regions, the one including all the moments belonging to that of the recognitive type, the other comprising all the moments belonging to the lower types. Within the subconscious, then, there is a threshold which the lower types of moments cannot pass. This threshold may be termed *the threshold of recognitive consciousness.*

The moments lying above the threshold of recognitive consciousness may change in psychic intensity, may pass through all degrees of sensory intensity and representative vividness ranging from *minimum* to *maximum;* they may sink and rise gradually or suddenly, but they do not and cannot fall, without becoming degenerated, below the recognitive threshold. Those moments that lie below the recognitive threshold cannot rise above it, they are condemned to remain in the obscure regions of the subconscious; their fate is never to enter the strong light of the upper world of consciousness. At the same time their psychic intensity does not suffer any change, they do not shift forwards and backwards in the field of consciousness like the moments of the recognitive type lying above the threshold, they remain unalterable, they are fixed.

In a certain sense the moments lying below the threshold of recognitive consciousness may be considered as dissociated from the upper regions, inasmuch as they lie outside the field of the upper consciousness. From the standpoint of activity, however, they stand in intimate relation to the upper level of consciousness. The highly organized moment uses the lower ones as instruments to carry out its purpose, and through them it also enters into relation with the external environment. Stimuli are received by the lower moments, and motor responses are once more given by these moments. In other words, the lower types of moments are in service of the higher moments.

From a teleological standpoint one can understand the importance of it for the life-existence of the individual. In order to save time and energy any activity that can be carried out by the lower aggregates is directly responded to by the less complex and more fixed moments. The lowermost moments are the easiest to gain access to by the external stimuli, and in case the adaptation is simple the response immediately follows without any reference to higher aggregates. Should, however, the stimulus be under conditions where more complex adaptations are requisite then the next higher aggregate is set into activity. The ascending degree of complexity of aggregates set into activity grows in accordance with the need of complexity of adaptation, until the most complex of all aggregates is reached, the one representing the complete organization of sensori-motor adaptations of the organism as a whole.

At the same time it must be pointed out that there is a series of moments almost independent of this organized hierarchy of moments, never falling under the sway, or but indirectly and casually being affected by the principal complex moment-consciousness; such are the moments that go along with functions, directly subservient to the internal needs of the organism. This complex aggregate of moments from its very nature is withdrawn from the general control of the other aggregates, inasmuch as it need not adapt itself to the varying conditions and different stimulations of the external environment. The set of stimuli this aggregate responds to remains almost unchanged, hence their activity is of a low order, belonging to the character of the reflex moments.

CHAPTER III

MODIFICATIONS OF MOMENTS IN THE ORGANIZED AGGREGATE

IN pointing out the parallel in the series of moments as they appear in ontogenesis and phylogenesis, we must make some restrictions. The series of the subordinate-moments in the organization of a highly evolved and complex moment may be homologous to the phylogenetic series, but still the two greatly differ in character. Each moment in the series subordinate to the principal moment is greatly modified in its activity and, as such, differs in nature from the moment of the corresponding stage in the phylogenetic series. A complicated act after a series of repetitions sinks into the subconscious, becomes degraded in character and falls to the level of the so-called "secondary automatic" acts. This does not mean that in the phylogenetic or even in the ontogenetic evolution the moment occupying a parallel stage is of a secondary automatic character, as it appears in the moment of higher organization.

When the sensori-motor series going to constitute the secondary automatic act becomes well organized, the links in the series fall to a *minimum* of psychic intensity, but the moment consciousness occupying a corresponding position in the scale of evolution has a higher psychic intensity than the one characteristic of the secondary automatic stage. The psychosis of a dog, horse, mouse, rabbit is hardly of the same order of intensity characteristic, for instance, of the act with which one buttons his coat, opens his door, walks in the street, or simply maintains his equilibrium. The consciousness of the dog, rabbit or mouse may be and surely is of a lower order than that of a man, but its intensity is not necessarily of the same level with the automatic activity of man.

The greater differentiation of elements in the highly constituted being is also their greater simplification. The lower a moment is in the scale of a highly organized being, the more differentiated it is, and the more simplified is its function in the organic whole. Quite different is it in the case of the lower type of moment in the phylogenetic series, there the differentiation has not proceeded far, and although it may be low in type and structure, the very lack of differentiation of function makes that lowly moment more complex as to function. A low moment of a high type of organization is lower than a high moment in a lower type of organization. A moment occupying a low stage in a statically established hierarchy is really lower than a corresponding stage in either the phylogenetic or ontogenetic series. The highest moment-consciousness of a fish is homologous with a very low moment in man, but the latter lacks the intensity to which the former attains.

The moment by entering as a unit in an organized hierarchy becomes degraded and loses much of its psychic activity by becoming differentiated and confined to one mode of reaction, though reaching its acme of perfection in that direction. The number of functions present, though in an imperfect, undeveloped, sketchy way, in the representatives of the low type of moment becomes narrowed down, even limited to one function, highly developed and intensified in the lower representatives of moments belonging to a hierarchy organized on the plan of a higher type.

If a, b, c, d, e . . . etc., represent the functioning modes of a low type of moment, then the total of functioning modes of the moment may be represented by the sum $(a^1+b^1+c^1+d^1+e^1+$ . . . $)$, each function is in its first degree, that is, it is present in a primitive undeveloped form. The low moment, however, forming a part of a highly developed organic hierarchy, becomes highly differentiated in the process of evolution of the whole and is finally reduced to the exercise of one function only, fully developed and intensified to its highest pitch. The number of functions then present in a primitive form in the moment of low type is in the course of evolution gradually sundered into its units, each unit reaching a high stage of perfection in the low moment belonging to a high type of moment hierarchy.

If a function in its primitive form is represented by a quantity, then the same or analogous function highly developed may be represented by the same or similar quantity raised to (n^{th}) degree. Now let a^1 stand for the primitive function, then a^n will stand for the fully developed function. The number of the moment's functions is limited, but highly developed. The moment's functioning activities may be represented by the formula: a^n+b^n. The highest moment of the low type has a richer and more variable content than the lower moment belonging to the higher type. This truth can be still further realized by having recourse to the higher guiding moment-consciousness, the lower moments are shown there to work with an almost mechanical-like activity. Man, dog, or monkey with their spinal or medullary ganglia only fall lower than a fully developed fish or a full grown lobster.

If we come to consider the moment of corresponding stages in the ontogenetic and phylogenetic series, we once more meet with resemblance, but at the same time with one of fundamental difference. The moment of high type that passes ontogenetically the stages of phylogenetic evolution does it in a general, and, so to say, sketchy form, each stage of ontogenesis in reality fundamentally differing from that of the parallel stage in phylogenesis. Just as the human embryo in the course of its growth and passing the stages that reflect phylogenesis is not necessarily once a worm, then a fish, then a bird, but only approaches these types in a most general form, so also is it in the case of the moment in the different stages of its growth; it *approaches* the lower types of activity in a most general and sketchy form.

The moment in phylogenesis is independent and is fully developed, while the corresponding stage in ontogenesis is but a stage in the growth of another and higher moment, and as such is certainly different in nature from the phylogenetic moment. The embryo in the first state, though provided with gills, is still not a fish and could not live in water. The consciousness of the infant in passing through stages running parallel to the lower moments-consciousness does not temporarily become that particular low moment-consciousness. It is simply a general outline of the type of moment-consciousness that the higher moment is passing or a stage in the course of its ontogenetic development.

The infant in the growth of its psychic life does not actually turn butterfly, fish, bird, monkey, savage, he does not really pass those modes of psychic states, but he passes through stages which in a general outline remotely resemble the lower grades of animal psychosis. All the stages are determined by the principal type of moment-consciousness, and, in reality, are not a series of low moments ending in a high type, but stages of growth of one high type of moment-consciousness. The stages through which the infant and child pass are the evolution of *man*. The moments of the low form develop on the type of $a^n+b^n+c^n+$ . . . . . ., while the moments of the highest forms develop on the type of $(a+b+c+c+, \ldots\ldots)^n$, a far more complex organization.

CHAPTER IV

MENTAL ORGANIZATION

MOMENTS of the same type form aggregations in an ascending series of complexity, groups, systems, communities, clusters, constellations. Isolated moments are organized into groups, groups into systems, systems into communities and communities into constellations. Groups are the simplest, while constellations are the highest and most complex of the aggregates. The firmness, the stability of organization stands in direct relation to complexity, the more complex an aggregation the less stable it is.

The order of complexity also represents the order of development, so that the more complex is also the latest to appear in the course of evolution. Evolution and stability stand thus in inverse relation. What appears early in the course of development is less firmly organized than what appears later on. The whole tendency of evolution is from stability to instability. The order of growth and instability is in the ascending scale—from groups, through systems, communities, to clusters, and constellations. The simpler sensori-motor reactions are, both ontogenetically and phylogenetically, the first to appear in the course of evolution and they are also more stable than the more complex sensori-motor reactions. We can possibly best realize the relation of instability to complexity of structure, if we regard life, including both physiological and psychic processes, as an ascending organization of sensori-motor reactions to the influences of the external environment.

The sensori-motor reactions represent a hierarchy of organized aggregations beginning in the lowest reflexes and culminating in the highest activity.

An illustration of the lower reflexes may be taken, such as the knee-jerk, the action of the bladder, persistaltic movements of the intestines, respiratory movements, heart-beats, and other organic activities. Association among these various reflexes may be taken as higher aggregates. The complex coordination of orientation and space adjustment, such as the maintenance of equilibrium, walking, running, jumping, flying, swimming, etc., represent more complex activity. A still higher aggregate is to be found in the association of groups and systems of sensori-motor reactions within the sphere of a sense-organ with the complex coordination of motor adjustment of the whole body. The highest aggregates are to be found in the association of all the motor reactions organized within the different spheres of sense-organs with the complex motor coordination of body-adjustments.

Simple sensori-motor reflexes, complex reflexes, sensori-motor coordinations, instinctive adaptations and intelligent adjustments, statically regarded, correspond to the classification of psycho-motor aggregates into groups, systems, communities, clusters, and constellations. In other words, the study of the sensori-motor constitution of the higher organized beings in their adult stages, reveals the presence and interrelation of moments. We find that the history of the use and growth of aggregates is in the order of their complexity. In ontogenesis we find that the simple reflexes appear first, then the association, the more complex sensori-motor coordination, later on the so-called instinctive adaptations begin to appear, while the intelligent adaptations appear late in the course of development.

The child at its birth is a purely reflex being; the different reflexes are not even associated, it is the medulla and the spinal cord that are principally active; the pupils react to light, the legs and hands react to more or less intense sensory stimuli, such as tickling, and sensori-motor reflexes to taste-stimuli are present. All of those reactions are isolated, incoordinated; they are so many simple groups of sensori-motor reflexes, even the sucking activity of the infant is largely of the sensori-motor reflex type; the child at its birth is a spinal being, and its moment consciousness is desultory, consisting of the desultory activities of isolated functioning sensori-motor groups.

Later on the reflex activity such as of the hands, legs, eyes become associated through the development of sight and kinaesthetic sensations; the eyes can follow an object, the hands become adapted to the seizing movements. Movements and body-coordination then begin to appear, such as turning the body to right or left, then sitting up, then creeping, standing, then walking, then talking, all involving more and more coordination of muscles and kinaesthetic sensations, aided by the association of sensations and sensori-motor reactions from different sense-organs. It is late in its history of development that the child begins to gain full control of its actions and adjustment to the stimuli coming from the external environment.

The history of phylogenesis runs a parallel course. The lower organisms are purely reflex in their sensori-motor reactions, and as such, they belong to the type of the desultory moment-consciousness, such for instance as may be found in the lower form of the Mollusca as the class Tunicata. In the higher forms of Mollusca association of sensori-motor reflexes begins to appear. These associations become more and more complex with the rise and growth of differentiation of sense-organs in the higher forms of Mollusca and the lower Arthropodes, giving rise to groups, systems, communities, reaching the cluster-stage, in the higher Arthropodes and the lower Mammalia, finally culminating in the complex functions characteristic of the constellation-stage, such as found in the sensori-motor reactions of man in his adaptation to physical and social surroundings.

Each highly organized moment represents a hierarchy of many moments, but of lower types. The highest constellation has at its command lower types of psychic aggregates, and had it not been for these lower moments, the higher type would have lacked matter and activity for carrying on its own work.

The lower forms of moments, however, are subordinate to the higher type which constitutes the centre, the nucleus of the total psychosis. The other constituent moments, from the simplest to the most complex, are in the service of the highest type of moments, though the former lie outside the central focus of the principal controlling moment-consciousness. These lower forms are by no means to be ignored, since they form the main factors that determine indirectly the moment's activity; they constitute the storehouse from which the central moment draws its material. Without the lower moments the principal, controlling moment could not have received stimulations from the external environment, nor would it have been enabled to make proper motor responses. In fact we may say that without the lower forms of moments, the moment-nucleus would have lost its vitality and even its meaning.

The perception of an object and the proper adjustments to it depend not so much on what is directly present in the focus of consciousness, but on the wealth of accumulated material lying outside the moment focus. In reading a book, for instance, the handling of it, the motor adjustments in keeping it, the perception of the letters, of the words, of the phrases lie outside the focus of consciousness, and still it is this mass of perceptions that forms the matter of the controlling moment. The inventor in working on his particular invention has a mass of accumulated material and experience indispensable for the development of the invention, subconscious material lying in the background of his consciousness. Similarly the mathematician in solving his problem which forms the focus of his consciousness possesses a body of knowledge or a mass of material which, though it lies on the margin of his consciousness, forms the main stay of his particular investigation.

There is more in consciousness than is actually directly present in the focus of the moment. While I am writing these last phrases my consciousness is occupied with them alone, but they are supported by a body of subconscious thought. All our perception is largely determined by the results of our previous experience which falls outside the central point of consciousness. Many perceptual illusions find their explanation in habit. An otherwise novel experience surrounds itself with familiar experience which disguises the novelty and transforms the percept by substituting what is otherwise familiar and habitual.

This mass of familiar experience is not present in the focus of the moment-consciousness, it lies outside the centre and is often submerged in regard to the direct introspective scrutiny; it has, however, a powerful influence on the activity of the moment. The submerged moments, though lying outside the direct group of the main focus, still exercise a great influence on the course of the moment's growth and development. The conscious controls the material supplied by the subconscious, while the subconscious by the quantity and quality of the mass of its material, in its turn modifies and determines the course of conscious activity.

CHAPTER V

THE GROWTH AND FUNCTION OF THE MOMENT

WE may turn now to the study of the moment's functions. This can be best investigated in following up its history, in watching the growth and development of the most elementary moment-consciousness. In its perceptual stage the moment-consciousness may become modified in its subordinate psychic elements only, indirectly reacting on the nuclear sensory elements, giving a further determination of the total moment without changing its fundamental character. The moment may express then only more distinctly the final aim to which it is striving. The changes brought about in the moment are of such a nature that the latter in its whole tendency becomes adapted for reaction to the external environment, a reaction for which it primarily maintains itself in being.

The moment as percept may have at first an inadequate content which brings about a reaction inadequate for the purpose of the given psychic moment. The reaction brings more content, both primary and secondary. The new content enriches the moment and gives rise to a modification resulting in a reaction which in its turn further enriches the content, until a reaction results fully adequate to the purpose of the moment. The moment reaches for the time being its full maturity. To give a concrete example. A small puff-fish is thrown into a tank containing a hungry tautog. The tautog perceives the puff-fish and comes up to seize it; the puff-fish begins to swell. The sudden swelling of the little fish frightens the tautog away. The tautog's reaction has proved unsuccessful. Some modification is being produced in the tautog's state relating to the puff-fish yonder. Another reaction may then follow, a sudden pounce and bite, the puff-fish swelling in the tautog's mouth. The tautog's reaction is once more a failure, the puff fish is dropped, but considerably hurt. A series of similar reactions with a series of similar modifications finally result in a totally different reaction. The fish by a series of sudden pounces and bites succeeds in debilitating the puff-fish, paralyzing its power of swelling and finally devouring it. A series of such repetitions of experiences determine the general procedure of the tautog to the puff-fish. The tendency to a series of sensori-motor reactions may thus become organized.

The chick emerging from the egg sees an object, say a caterpillar, and attacking the caterpillar misses it at first. This procedure enriches the chick's psycho-motor life and modifies its next reactions in relation to the caterpillar, until the whole moment of pecking at edible objects when presented to the eye consists of successful reactions, as the result of their repetition, finally ending in perfect organization. The infant in seeing an object makes at first fruitless attempts at seizing it. These futile attempts further determine his activity and finally he reaches a state when the adaptation is complete. The psycho-motor reaction becomes adequate to the stimulus.

In all these cases there is no need that the growth and improvement of adaptation should be brought by explicit processes of judgments and associations of free ideas. The fish, the chick, the infant have no distinct consciousness of what sort of psychic process is going on, nor do they deliberately after weighing the *pros* and *cons* of their actions, finally decide on one which is consciously to be rejected on trial and so on, at length hitting on the right solution of the problem. Such is not the state of their mind. To ascribe to them conscious thought, cunning, knowledge, is to ascribe modes and forms of adult human consciousness to a lower stage where all this is absent. Their psychic processes are far simpler. The growth of the moment-consciousness in the stage under consideration is altogether different in nature from that of the adult stage.

In the moment-consciousness under consideration each sensory response to a given stimulus along with its resulting motor reaction brings about a modification of the total moment. Each new modification brings the moment nearer in its sensory and motor elements, to a more perfect adaptation to the specific conditions of the external environment; this modification is reproduced on the recurrence of the moment.

Let a be the moment and b, b_1, b_2, b_3, the successive modifications, then the modified moment at each stage of its growth may be represented as follows: a, ab, abb_1, abb_1b_2, $abb_1b_2b_3$, etc. The reproduced successive modifications do not emerge singly. The reactions of the moment do not occur in repetition of the order in which they have primarily followed each other. In other words, the reactions are not gone through in the order in which they have taken place. The series is not literally repeated. Each subsequent modification is super-imposed on the previous ones and modifying them becomes synthetized in a single complex reaction. The last successful reaction is the only one that emerges in the occurrence of the particular stimulus under a given set of conditions.

All the intermediate, unsuccessful reactions, although they have gone to determine the last state of the moment with its particular reactions and are implicitly contained in it, gradually drop out, and only the last forms of reaction occur. The last moment-consciousness at each birth generated by a given stimulus under appropriate conditions possesses in a vague outline the history of its previous stages. Most of the stages seem to drop out, only the ones that are indispensable remain.

The moment-consciousness in its growth and development expands into a series of moments, each subsequent moment being an expansion of the preceding one. In this expanded series each succeeding moment is richer in content than the one that has passed away, and is more adapted to the original end for which the moment as a whole subsists and maintains itself in the struggle for life. The last moment is an epitome of the preceding series, an epitome in which by adaptive selection many links have dropped out, and in which the ones that survive appear not in their bare isolation, but in a synthesis of organic unity.

In respect to synthesis the moment may be compared to the percept in which the moment-elements are not in a free state and cannot be separately reinstated. In the moment as in the percept the elements are firmly bound together, and in this bondage they are reproduced. In the psychic moment itself the previous stages are not discriminated, since the whole moment emerges as one compound in which the elements are firmly held together in a form of "mental-chemistry" by a process of cumulation, a process which, as we have pointed out, is essentially different from the process of association of ideas in which the ideal elements are free.

A moment-consciousness lacking free elements in its constituents cannot know its own history; in other words, it cannot recognize the identity or similarity of its elements with the ones that have been present in a previous state. The recognitive element is entirely wanting in such a type of moment-consciousness. A moment-consciousness of such a nature may be termed *reproductive*. *A reproductive moment-consciousness reproduces its contents, but lacks the element of recognition.*

CHAPTER VI

THE RELATION OF THE MOMENT TO THE ENVIRONMENT

IF we inspect closely the reproductive moment-consciousness, we can discover in it definite traits specially characteristic of it. From the very character of its organization the moment-consciousness is of such a nature as to be accessible to and at the same time affected by definite stimuli of the external environment. The moment-consciousness itself is formed through the influence of stimuli coming from its environment. The psychic states that go to make up the nucleus-content of the moment-consciousness are primarily sensory in character, due entirely to incoming stimulations proceeding from some external source. This is fundamentally true not only of the lowest and simplest, but also of the highest psychic moment. The infinite wealth of our experiences is of an incoming character derived entirely from stimulations coming from the periphery, or from the outside world. Even where the moment is ideal in character it is still originally derived from sensation.

The nature and primary function of the moment is to be sensitive to stimuli. The origin of the moment takes its rise in sensory responsiveness, and its growth is due to the formation of successive layers of sensory elements. The sensory characteristic is still further brought out in the fact of adaptation and possibility of further modification of the moment. Psychic modification under the influence of external stimuli clearly demonstrates the important characteristics of sensitivity. We may say that sensitivity, meaning by it psychic processes aroused by stimuli, is a fundamental character of the moment-consciousness, however elementary.

The moment-consciousness is not only sensory, but also motor in character. The whole purpose of the moment's being is adaptation to external conditions. These adaptations, however, are brought about not by *the mere sensitivity,* but by motor reactions. If the moment shows sensitivity towards the play of definite external stimuli, it shows itself still more ready to give vent to its activity in definite sets of motor reactions. In fact we may say that primarily sensitivity is readiness for reaction. The stimulus that irritates the naked protoplasm of the amoeba results in movement of its pseudopodium. The irritation of the nerve endings of the ascidian or of the medusa results in the contractions of the muscular coat. In the more highly organized animals the excitation of the peripheral sense-organ results in contraction and relaxation of muscles or secretions of glands.

This is clearly manifested in the life-phenomena of invertebrates and lower vertebrates. The fly, the bee, the ant, the butterfly, the fish, the frog react immediately as soon as they are acted upon by influences of their external medium. In this respect they almost resemble highly complicated mechanisms that manifest definite sets of movements when acted on different parts of structure. Especially is this manifested in the lower centres.

The fly, the ant, the bee, the butterfly, without their higher central ganglia are pure automata. Thus if the fly is deprived of its frontal ganglia, or head, it remains quiet as if dead, until it is stimulated, when a motor reaction immediately follows. If such a "headless" fly is turned on its back, it rights itself, or flies some distance, alighting on its legs, and again remaining in the same state until a new stimulus brings it out of its torpor. If the thorax is stimulated, the front legs pass through the wiping movement. If the delicate hair on the lower part of the abdomen are irritated, the hind legs react. If the side hair are stimulated, the side legs respond, and so on. In short, the stimulus is followed by immediate reaction of the stimulated organ.

With the central ganglion present, the fly differs but little as a reactive being, only the reactions are more complicated, more co-ordinate, more adaptive; they do not occur in a uniform and automatic fashion in the directly stimulated organ, but in some other organs distant from the stimulus directly applied and in a series of co-ordinate movements, responding to the stimulus in a form advantageous to its needs, or preservative of its life.

In the frog we meet once more with the same state of things. Without its brain the frog is an automaton responding to external stimuli immediately with some simple set of movements. With its brain present the response differs only in the fact that it is more complex and more adaptive. The same holds true in the case of the higher vertebrates, in the bird, in the rabbit, in the dog, in the monkey, and also in man. When deprived of the brain they are automata immediately responding to stimuli with simple movements of but little adaptation. With their brain in full and healthy function they are, biologically regarded, highly organized beings responding to external stimulations with complex movements of more or less perfect adaptation.

Should we like further illustration and evidence we can find it not only in phylogenesis, but also in ontogenesis. Young animals react to any passing stimulus; their life is full of movement and activity. The movements are not adaptive to the special conditions of the environment; in fact these reactions may often be of such a nature as to hurt and even endanger the life of the young animal. External stimuli simply liberate pent-up energy in centres which are but little co-ordinated. In this respect of lack of co-ordination and adaptation young animals resemble vertebrates or invetebrates deprived of their frontal ganglia.

The restlessness of children and of infants is notorious; in an infant under my observation, I have observed kicking of legs as many as 25-35 per minute, and this was kept up for a quarter of an hour, sometimes for half an hour at a time; each kick of the leg served as a stimulus for another one, until fatigue was induced. An external stimulus at once calls forth a reaction in the child or the infant. The reaction is usually not adaptive, purposeless, and frequently hurtful.

There are also purposeful reactions, reactions that are of a purely instinctive character, useful for the life and growth of the animal. These reactions, however, are, physiologically regarded, of a more complex reflex character. Given a definite stimulus and a certain set of conditions, a series of reactions immediately follows in a certain order and succession. Thus the aphis secretes its limpid drops of sweet juice, when its abdomen is tickled by the antennae of the ant only. No other delicate tickling stimulations can bring about the reaction of secretion. The ant on seeing the aphis runs at once up to it and begins to play with its antennae on the abdomen of the aphis, and the latter on feeling the particular stimulations reacts in lifting up its abdomen and secreting the viscid juice.

The white butterfly lays her eggs as soon as it comes in contact with stimuli coming from cabbage leaves. As soon as the change of temperature occurs, the migration instinct of birds is awakened. Young pointers are sometimes known to point the first time they are taken out. Young chicks disperse and show fright as soon as they hear an intense sound. In an infant of two days old I have observed protective grasping movements; the infant when immersed in the bath tub for the first time got hold and clasped firmly with his little finger the hand of the person that bathed him. Furthermore, the whole body assumed strained and rounded positions, lifting itself out of the water with which it came in contact; the infant was clinging with all its little strength to the hand that bathed him.

The character of instinctive reaction is perhaps more closely manifested in the following interesting experiment performed by me on a very young infant. The infant was not more than three hours old, he was put to the breast and the nipple put to the mouth. The stimulus of the nipple in the mouth at once excited the physiological arrangement for sucking movement, an arrangement which the infant brings with him in a more or less ready state, on his coming into the world. When the infant had enough, the sucking movements ceased. The nipple was then withdrawn, and then put again into his mouth, the sudden fresh stimulus once more awakened the mechanism to activity, and the sucking movements began only to stop soon. This was repeated a few times, every time as soon as the stimulus was supplied the sucking movement began.

The experiment was then slightly modified, the baby after ceasing its sucking movements was left keeping the nipple in its mouth, and instead of taking away the nipple and putting it back, thus enforcing the stimulus directly, some other stimuli were employed. The infant's legs were tickled, the skin of the body was rubbed, pricked in different places, and every time as the stimulus was applied the sucking movements were started.

A few hours later when the baby became sensitive to sound, I tried the same experiments with sound stimuli, and obtained the same results. Sensory stimulations followed by motor reactions are the elements out of which moment-consciousness from the lowest to the highest is formed. If one aspect of the moment-consciousness is sensory, the other aspect is motor. The two aspects are inseparable, correlative.

The sensori-motor relation is observed not only in the lowest forms of psychic life, but also in the highest. In the highest form of mental life we still meet with the same factor of motor reactions. Mental activity tends to pass into action. Psychic processes, motor and glandular reactions are interrelated. All along the course of mental activity reaction is present as its invariable concomitant. Some muscles are in a state of tension, others in a condition of relaxation. According to the flow and content of ideas, representation is now retarded, now accelerated. The functioning activity of the glands, of the vaso-motor system is influenced, the circulation of blood is affected, more blood rushing to the brain.

This reaction aspect of mental life, and especially of affective, emotional life, can easily be demonstrated by appropriate instruments. By aid of the sphygmograph, the tromograph, the pneumograph, the plethysmograph, the automatograph, the galvanometer, and other instruments registering physiological results, it can clearly be shown that mental activity with its affective tone results in some end effect, muscular or glandular reaction. With a very delicate automatograph, or swinging pendulum, it can even be shown that the movements manifested often express the content of consciousness.

This is especially striking in case of different forms of automatisms—in people who are of the motor type. When the subject's hand is put on the automatograph, and the subject begins to think, the pen of the automatograph begins to move and write. When the person thinks of the left side of the room the movements swing to the left; when the subject thinks of a series of definite movements, movements of a similar order and character are followed out by the pen of the automatograph. Subjects who are of a pronounced motor type when their attention is distracted write with the automatographic pen the ideas of which they happen to think at that moment. The remarkable experiments made by Pavlow and his pupils are here to the point. The experiments clearly prove the close interrelation of mental activity and glandular function.

The reaction character of mental life is still more distinctly manifested in the various forms of mental dissociation, such as are to be found in the psychopathic and neuropathic diseases and in the states of hypnosis, and in fact in all the phenomena belonging to the order known as the subconscious. Many of the most important methods in psychology and psychopathology are based on this reaction aspect of the moment-consciousness.

CHAPTER VII

THE ASSIMILATION OF THE MOMENT IN NORMAL STATES

THE fact that the moment-consciousness expands, grows, and develops in its organization until it reaches a point of perfect adaptation to external conditions clearly shows that the moment is capable of working new psychic material into its constitution. The material which it gets is of such a nature as to help to perpetuate the psychic life of the moment. The moment cannot possibly go on growing without having such material at hand. If the moment comes in contact with any psychic element or experience that can further its content, the experience is at once seized on and synthetized in the moment. The psychic element is not simply taken in and associated or annexed to the rest of the content, it is actually transformed in this process.

When the moment is stimulated to activity by an external object, the sensory stimulations of the present time-moment are new. Just these particular stimulations and sensory processes awakened have not occurred as yet in the life history of the animal, and still the object meets with its appropriate sensory response and motor reaction. The moment that has more or less like content to the given new psychic experience aroused appropriates the new states, works them into its own psychic content, and sends out its characteristic reaction in response to the stimuli. The moment that gets hold of new psychic material is ordinarily the one which is in the process of activity at the given time when the stimulations occur. The new material is absorbed by the moment as a whole, and is then assimilated by the functioning nucleus. The primary sensory elements of the nucleus become strengthened.

At the same time the new sensory material absorbed awakens some new secondary sensory elements which are assimilated by the secondary sensory elements constituting the so-called protoplasm of the moment. In this absorption of new material the moment does not and cannot possibly remain exactly the same, it is modified in a degree, although the internal relations of its constituents may practically remain unaltered. Readjustments may occur and usually do so, but they are made as nearly as possible to the old plan, and are assimilated to the old content.

In the perceptual moment of the tautog that which constitutes its content may be the perception, say of a little fish yonder; soon, however, a new feature may arise in the course of experience, namely, change in color for instance in the case of the squid, or swelling in the case of the puff-fish. If the fish usually reacts in making attacks when receiving perceptive stimuli coming from small fish, and if the new experience is somewhat unusual in its ordinary life experience, and at the same time not so striking as to call forth the reaction of fear, the fish will still carry out its ordinary reaction of aggressive movement, slightly modified by the new incoming experience.

The chick in seeing a cinnabar caterpillar has the new experience of the different color from that of the caterpillar on which it usually feeds, but the reaction is still the same which caterpillars call out in chicks, namely, seizing and pecking. The new experience of taste got through the reaction may further modify the reaction of the chicks when confronted with cinnabar caterpillar.

The young infant pushes indiscriminately everything in its mouth, everything is for sucking, and only by experience it learns gradually to modify its reaction towards objects. On seeing a lemon, a child that is only acquainted with oranges will take it as an orange. The child will perceive the new visual experiences given by the lemon, as different from orange, but they will be assimilated to his sensory orange experience. The special visual experiences will give rise in the child's mind to some qualification of the percept "orange," the object being a kind of orange, a bad orange. The reaction in relation to the lemon will then be of the kind relating to orange in general. This reaction will be of course modified by repeated experiences resulting from a series of reactions in relation to the lemon.

Savages confronted for the first time with the horse or the ox, consider them a species of pig, an animal with which they are well acquainted, and they expect from the horse, or the ox similar manifestations. Their reactions towards those new species of animals will be of the same kind, as if those animals were pigs.

The same relation is still better illustrated in cases of young children with a definite moment-consciousness, which for convenience sake may be characterized as the family-moment. The child's moment-content of life-relationship consists of his experience gotten from his relation with his papa and mamma. Baby, papa, and mamma and their various relations go to make up the total moment of the child's family life experiences.

When the child is confronted with young animals, the latter are regarded in the light of "babies," they are also babies, they have their papas and mammas who give them cookies, tea, and oatmeal, undress them, and put them to bed.

A young child of about three years and a half asked me whether the baby-calf's mamma gave it pie to eat. Another time the same child on seeing a young kitten inquired after its mamma and papa, and when the baby kitty was going to have its tea and put to bed. In one child of less than three years old, young animals, plants, such as young trees and flowers, and even little stars were so many "baby Willies." Their lives were fully assimilated to his own, they were eating oatmeal, drinking milk and were having tea, sugar, and biscuits for their supper. The same child was greatly surprised and partly even horrified at finding that baby-Willie-flowers had no papa and no mamma. The moment-consciousness is awakened by definite specific traits in the object, by familiar experience sense-data constituting the content of the moment; the rest and differential traits of the object are worked into the general plan and character of the functioning moment.

The assimilative power of the moment is clearly revealed in the very character of perception. That pitted object yonder is perceived as an orange with all its attributes of color, shape, size, weight, fragrance, and taste. The synthesis of so many sensory elements corresponding to such a complex of stimuli was gradually effected in the course of ontogenetic development, and no doubt determined by inherited disposition of phylogenetic evolution.

Suppose the orange turns out to be a new species never met before by the individual; it feels differently when touched, it has different weight, special taste, and fragrance. When such sense data are experienced repeatedly, the percept orange is modified by assimilation of the new sense data. On seeing another time such a sort of an orange all the previously separately experienced sense-data appear together in one synthetized percept. The moment-consciousness which we, for illustration sake, have assumed as consisting only of experiences relating to oranges and with corresponding psycho-physiological reactions, has enlarged its content, has increased, and modified its adaptation to external conditions.

The assimilative power of the moment-consciousness is well brought out in the activity of the higher form of consciousness. The desire to go to the post-office to get my mail forms the central point of my present moment-consciousness. Round it as a focus are grouped ideas, feelings, and sensations, all more or less tending in the same direction. The actual walking to the post-office gives a series of new motor sensations which are subconsciously assimilated by the moment as a whole. The tactual and motor sensations coming from each step are assimilated by the moment, leading in their turn to new series of reactions. Each new step is followed by new sensations that give rise to new reactions and so on, until the end of the moment is reached and the purpose accomplished.

The whole sensori-motor series is guided by the nuclear elements of the moment, although the successive stages of the series are assimilated subconsciously. In reading a book the successive stages are guided by the central general idea. The perception of the letters, words, and their isolated meaning is assimilated subconsciously, all of them being incorporated into the guiding moment-consciousness which is growing and developing, becoming enriched with more and more content. In writing a letter or an article on a certain subject we find the same fact of assimilation by the moment-consciousness of the sense-data coming in the successive steps of the whole experience. The handling of the pen, the dipping it into ink, its guiding by the hand, its gliding over the paper, the drawing of the letters, the formation of letters into words, and of the words into lines and sentences, all follow in successive stages and are assimilated partly subconsciously and partly consciously. All are guided by the principal moment which grows richer in content with each successive step made, with each succeeding link of the series. In fact we may say that all those successive steps are stages in the growth and development of the one moment-consciousness.

The growth and development of the moment-consciousness is through its assimilation of fresh psychic material. In the man of science a favorite theory exercises such an assimilative power over facts otherwise disconnected. The moment-consciousness having the given theory as its nucleus absorbs more and more material, and with the assimilation of new material the content and strength of the internal organization grows in a corresponding degree. The assimilation is guided by the intense interest aroused by the nucleus of the total moment, and is in its turn aided by the active process of assimilation, especially by the influence of submerged, subconscious moments which have reached the *minimum* of consciousness, or lie on the margin of the sphere of waking consciousness.

The influence of the subconscious is in proportion to the duration and intensity of the activity of the mental process. We are well acquainted with the fact that an action requiring at first great stress of attention, finally, with its repetition, drops out of the focus of consciousness and becomes, as it is called, automatic or unconscious. They who have observed a child striving to stand by himself or beginning to walk realize how such seemingly automatic acts as standing or walking are at first accompanied with intense attention. The child, when standing up all by himself, does it hesitatingly; he shakes and trembles, as if occupying unsafe ground, or doing a difficult act; he looks around for support, stretches out his hands, asking the help of his parents or nurse, and if he does not get aid in time, begins to cry from fear and drops on all-fours. It is a difficult feat for him. Withdraw his attention from his performance, and in the first stages of his series of trials he drops helplessly to the ground.

The same holds true in the case of walking. The child in beginning to walk, does it with great hesitation and fear. It can only be compared to the attempt of an adult in learning to walk a rope, or a narrow board on a high place. Each step requires intense attention. The least distraction of attention and the baby falls down in a heap. The least change in the touch, muscular and kinaesthetic sensations arrests the successful attempt at standing or walking. Thus in the case of my baby of fourteen months after the first two days of more or less successful trials at walking, a new pair of shoes was put on. This arrested the walking. When the baby became accustomed to the new sensations which fell in the background of his consciousness, he once more started a series of trials, and with such success that after two days' practice he walked almost a whole mile.

After a period of long practice the complex muscular adjustments, required in the acts of standing and walking, gradually retreat to the background of consciousness and become automatic. Not that consciousness in those acts is lost: it has simply reached its necessary *minimum,* leaving the focus of consciousness free for other new and unaccustomed adjustments, which in their turn retreat from the centre to the periphery and fall into the subconscious. The usual movement of mental processes is *from the conscious to the subconscious.*

Experiences, however, may first be perceived by submerged subconscious moments and then transmitted to the focus of consciousness, the movement of the process thus taking a direction opposite to the usual one, from the subconscious to the conscious. Experiences, for instance, lived through in hypnotic states, in trance states or in dreams, may come to the surface as hypnoidal states and then become synthetized in the upper waking consciousness, or they may be lighted up in hypnosis, and then permanently synthetized in the centre of attentive consciousness.

Similarly experiences first lived through in the subconscious states induced by alcoholic intoxication or by anaesthetics may be brought by hypnoidal states or by hypnosis into the focus of consciousness. Hypnoidal states are uprushes of the subconscious, and by means of them many a hidden and obscure region of the subconscious may be discovered. Thus the Hanna case was largely marked by hypnoidal states. In many of my cases hypnoidal states are the means by which subconscious experiences become completely revealed. In cases of amnesia the hypnoidal states give glimpses into subconscious regions which even deep hypnosis can not reveal.

The method of guesses is valuable in showing the reverse process of mental activity, the passage of a subconscious state into the focus of consciousness.

If the anaesthetic spot of a psychopathic case is stimulated, the patient is unaware of such stimulation; should he, however, be asked to guess, or to tell anything that happens to come into his mind, he is often found to give correct answers. The patient perceives *subconsciously*. This perception, often in a slightly modified form, is transmitted to the upper consciousness, or to what for the present constitutes the patient's principal moment consciousness, or personality.

If, for instance, the anaesthetic spot of the patient is pricked a number of times, the patient remains quiet and is seemingly insensible. Should we now ask the patient to tell anything that comes into his mind, he will say, "pricking" and will be unable to tell why he happened to think of "pricking" at all. Should we now ask him to give any number that may enter his mind, he will give the correct number, once more not being able to give the reason why this particular number happened to enter his mind, considering it a mere "chance number." The subconscious sensations experienced are transmitted as abstract ideas to the focus of consciousness.

Often instead of the particular idea being transmitted, only the general aspect of it reaches the focus.

Thus the patient is not able to guess the particular nature of the stimulus, but he may give the character of the unfelt stimuli. This reveals the reverse movement from the subconscious to the conscious.

This reverse movement of the psychic state, from the originally subconscious to the upper consciousness, is well manifested in psychopathic cases of visual anaesthesia as well as hypnotically induced anaesthesia. The patient's field of vision is limited. If objects are inserted in any place of the zone extending from the periphery of the narrowed field to the utmost boundary of the normal field, the patient can guess correctly the names of the inserted objects invisible to him. General guesses are correct on the periphery of that "subconscious" zone. Some of the phenomena of paramnesia can be explained by this principle of reverse movement, when subconscious experiences transmitted to central consciousness appear under the form of "familiar" memories.

A lighting up of the subconscious regions bringing about a reverse movement from the subconscious to the conscious can also be brought about by the use of toxic drugs. Pent-up neuron energies become liberated from lower and lower-most moment consciousness, long forgotten experiences well up to the centre of consciousness; outlived moments are resurrected and come to the focus of consciousness with all the vividness of a present perceptual experience. Thus De Quincey, in his "Confessions of an English Opium-Eater," tells us that "the minutest incidents of childhood or forgotten scenes of later years were often revived. I could not be said to recollect them, for if I had been told of them when waking, I should not have been able to acknowledge them as my past experience. But placed as they were before me in dreams like intuitions and clothed in all their evanescent circumstances and accompanying feelings, I recognized them instantaneously."

Hypnoidic states reveal the wealth and extent of psychic experience hidden in the subconscious regions. Glimpses into the subconscious are also given in hypnoidal states which are induced by the process of hypnoidization. The patient is asked to close his eyes and keep as quiet as possible without, however, making any special effort to put himself into such a state. He is then asked to tell anything that comes into his mind. The patient may also be asked to attend to some stimuli, such as reading or writing or the buzzing of an electrical current, and he is then to tell the ideas, thoughts, images, phrases, no matter how disconnected, that happen to flitter through his mind.

This same condition of hypnoidization is sometimes better accomplished through mental relaxation with concentration of attention in a definite direction. The patient is put into a quiet condition, and with his eyes closed and the experimenter's hand on the patient's forehead, the latter is urged to mental effort and strain, and, if necessary, given some hints. Experiences seemingly inaccessible flash lightning-like on the upper regions of self-consciousness. In all such cases the active moment-consciousness seizes on and assimilates any cognate experience, conscious or subconscious.

CHAPTER VIII

ABNORMAL MOMENTS

THE power of the moment's assimilation is well brought in the activity of abnormal moments. Distressing thoughts, gloomy ideas, painful sensations, and feelings of depression form a nucleus round which other mental states become firmly organized. A delusion arises which constitutes the moment-consciousness of the melancholiac. This moment assimilates all other cognate experiences. Everything that takes place is seized on by the moment and assimilated. The patient who believes that he has no intestines, or that he is made of glass and is transparent and hence hides himself from people, as his functions are open to the sight of outsiders, such a patient will make all experiences confirm and strengthen the delusion. The delusion constituting the predominant moment-consciousness in the patient's life absorbs and assimilates most, if not all of the material that gains access to the patient's psychic life. The moment like a cancerous growth expands, grows, and develops at the expense of other moments, starves them by cutting off their mental food supply. What cannot be used by the moment is rejected as waste material.

A similar state of affairs we meet with in paranoia. as well as in many paranoidal states of a purely psychopathic character. A moment-consciousness is formed of high organizing and assimilating power. Any experience relevant and irrelevant entering consciousness is greedily absorbed and assimilated. Any flitting thought, any passing impression is worked in and organized into the moment. All other moments fall a prey to this dominant all-absorbing moment.

In some cases the assimilating capacity of the moment seems to be limitless. In fact, the more it assimilates, the greater grows its craving and capacity for getting more material. The most trivial facts, the slightest sense-impressions all are pressed into the service of the despotically ruling moment. The insignificant becomes significant and points to the central delusion.

In other cases the limit of the process of assimilation soon reaches its maximum point, more psychic material is rejected by the moment. Such conditions are to be found in various states of dissociation manifested in different forms of psychopathic diseases. The moment's capacity for assimilating new material is of limited range, soon reaches its utmost bounds and loses for the time being all capacity for further assimilation. Such states may be found in amnesia. The moment is then said to be dissociated from the main current of psychic life-activity. Specific stimuli under definite conditions are requisite to resuscitate the moment and arouse its power of assimilation.

It is certainly interesting and instructive to study the fluctuations of the moment's power of assimilation in abnormal mental states. In some forms of mental diseases and general psychic derangements the moment may be of ephemeral and unstable character; it may dissolve soon after its birth. Such conditions are to be found in various forms of maniacal states and in the initial stages of many cases of general paresis.

In psychomotor manifestations of a psychopathic character moments-consciousness are often formed and dissolved like soap-bubbles. The investigation of them is of the utmost interest and value. In hypnosis moments of such a nature may be experimentally induced and studied. The whole process can thus be followed through all the stages of evolution and dissolution.

A greater condition of stability is to be found in the various automatisms preceding or following epileptic seizures, or in the so-called "psychic equivalents of epilepsy." The pure "psychic epilepsies" are essentially hypnoidic states, moments of stable character. This can be demonstrated both by observation and experiment.

The principle of selection is fundamental in the life-history of the moment. The whole tendency of the moment is to select material conducive to the furtherance of its activity and to reject all material that thwarts its functions and growth. This process of selection is from a biological standpoint essential for the survival and development of the moment.

The development of the moment may become arrested on some one stage of ontogenesis, and then the moment, belonging to a higher type resembles in its psychic activity that of a lower type; although it has many vestiges of the higher type, it is greatly modified in nature and as such really differs from the healthy normal representative of the corresponding low type. Still we may affirm that the arrested high type has virtually become a moment of low type. The state of psychosis of the imbecile, or idiot, may be taken as a good illustration. The mental activity of the idiot resembles the lower types of animal psychosis. Although as we have already pointed out, the consciousness of the idiot and that of the animal are by no means identical, still both belong to a low type of moment, and as such, they may be put on the same level.

In pathological cases where mental degeneration sets in we also have a similar course. The moment of the higher type becomes degraded and falls to the level of lower and lowermost types, according to the advance of the process of degeneration. Such states are to be found in the degenerative psychosis characteristic of secondary dementia. When the pathological process is wide, intense, persistent, and lasting, then secondary dementia results in most cases of mental degeneration. Should, however, the process become arrested then the moment simply falls to the level of a relatively lower type.

CHAPTER IX

MENTAL CONTINUITY AND THE PSYCHIC GAP

THE activity of the moment-consciousness is continuous, without break and interruption. Should the activity become arrested and the break be seemingly absolute, continuity is still present with the resumption of activity. The thread is taken up where it was dropped, the moment appears as a whole without any break. *There is no lesion in the moment consciousness, at least as far as the moment itself is concerned.* In going to sleep and waking up again we may be indirectly conscious of the interruption, but the activity of the moment is still continuous, the moment begins its activity at the point where it has left off. In fainting, in coma, in hypnosis, or somnambulism the periods of unconsciousness are immediately bridged over by the awakening activity of the moment.

Objectively considered, we have the moment's activity, then break, or absence of that activity, and then the resumption; subjectively, however, the moment's activity is felt as one and continuous without a break and gap. In consciousness the psychic content and activity preceding the break along with present cognizance of the break are synthetized into a unified continuity; the present consciousness of the break is taken into the synthesis, the very gap thus forming the bridge for unity.

The cognizance of the break may, however, be completely absent, and the edges of the mental wound may become closed, healed, and united with the functioning activity of the moment, the moment, without even the least consciousness of the intervennig gap, resuming its line of work precisely at the place where it had been arrested. From the moment's own standpoint, the gap is as if non-existent, there is no break in the moment's psychic life-activity.

The break formed by the interruption of the moment's functioning activity, objectively regarded, may present an actual gap in which, for all intents and purposes, it may be supposed that no mental activity is taking place. Such cases are found in the state of deep sleep, undisturbed by dreams, or in the states of unconsciousness produced by toxic and narcotic agencies, in states of deep coma, in the attacks of typical epilepsy, *petit* or *grand mal,* in *status epilepticus,* in the states of unconsciousness produced by intense mechanical stimuli, such as a blow, or a fall, or a strong electrical current. In all such cases we often find a state that may, for all intents and purposes, be characterized as unconsciousness. No other moment comes to the surface, even temporarily, to fill the mental gap caused by the interruption of the moment's functional activity. The gap presents a mental blank.

To the important question: "How, then are we to explain amnesia where consciousness is indicated?" Ribot answers "By the extreme weakness of the conscious state." This explanation is inadequate. For first of all, what is the meaning of a weak state of consciousness? Is it a state felt as being weak? If so, the explanation is obviously wrong. We may far better retain in memory the whisper of a dear friend than the striking of the tower clock or the explosion of a gun. Does he mean by a weak state of consciousness a confused indistinct state? Once more he is wrong. A confused and indistinct state of mind is often clearly remembered. I am dizzy, everything is confused and indistinct, I am unable to tell in detail what I have seen and heard, but I can clearly and distinctly remember the state of dizziness and confusion, and very often far better than any other less confused mental state. This, however, is not the case in the states of amnesia under discussion.

In amnesia there is no memory at all of the experienced mental states and what the subject or the patient remembers is the last link of the state preceding the amnesia. The state preceding the amnesia and the one succeeding it are joined together, the intermediary is left out, as if it had never been in existence. Evidently the theory is that the state of consciousness is so weak that it leaves no "trace," no memory behind. But if this be the case, then the explanation is a tautology. The problem is, why is there no memory in certain states of consciousness? To this the reply is that the states of consciousness leave no memory behind. It is obvious that this explanation is vague and when one tries to give to it a definite meaning, it is either wrong or turns out to be a reasoning in a circle.

Granted, however, that a weak state of consciousness is something definite, that by it is meant to indicate confusion, indistinctness of consciousness, and granted furthermore, that such a state leaves no memory behind, how then shall we explain amnesia of mental states when consciousness was intense, clear and distinct, as in the case of hypnosis or of artificial somnambulism? In these states the senses are almost hyperaesthetic, the sense of discrimination is extremely acute and memory is in a state of exaltation. Why is it then that amnesia can be enforced in the case of almost any experience immediately after the trance is over, or even during the very state of hypnosis? *The state of consciousness is intense and still there is amnesia.*

How is it in cases of double consciousness or of multiple personality? Surely the explanation of "weakness" of the states of consciousness cannot be advanced by any one who has a personal knowledge of these phenomena. How is it in psychopathic cases where the amnesia is brought about by an intense painful state of consciousness, such as fright, fear or great grief? On the theory of weakness of consciousness all these phenomena are mysterious, incomprehensible. On our theory of moment-consciousness, however, the phenomena presented could not possibly be otherwise, in fact, we should expect them *a priori,* if our theory be correct.

A psychic blank, however, is not the only possible consequence of the moment's lapse of function. The moment's activity is interrupted, but only, what is more often the case, to give rise to activity of another moment. The break produced in the moment's life is not a real gap; for the gap is filled in with the functioning activity of another moment which is usually of a lower, though sometimes it may even be of a higher type. From the standpoint of the arrested moment, however, there is a distinct gap, not that the moment itself is cognizant of the gap, but it is so for the external observer that takes that moment for his standpoint. The gap exists *in* the moment, though not *for* the moment.

Such states may be found in hypnosis especially in that stage of it known as somnambulism. When the subject falls into a deep hypnotic state, it is possible to make him pass through a series of complicated actions, changes of personalities without the least awareness on awakening. The whole series of his waking consciousness it is as non-existent, in short, it is a gap.

This gap however, is far from being a mere mental blank. On the contrary there may have been intense psychic activity, but only that of another moment which in the waking state has become submerged. This submerged moment may be brought up in the waking state by suggestions or by means of hypnoidization and be synthetized in the upper consciousness. Sometimes glimpses of the submerged moment may come up in dreams, in reveries, in sudden flashes during the waking state, or in spontaneous hypnoidal states, the subject doubting whether they refer to something actual or are simply mere whims and fancies.

In the cases of the so-called "psychic epilepsy" which are really amnesia of a psychopathic character, one meets with psychic states in which the gap is not absolute, but relative, being filled with the activity of another moment. Thus, M. carried on conversations, arguments, and discussions while in the abnormal subconscious state and could not remember anything of it when emerging from it and returning to the normal condition. Similarly F. in his subconscious state travelled a distance, sold horses and returned, but knew nothing of what had taken place from the beginning to the end of his journey.

In the H. case the gaps formed in the secondary state by the manifestations of the primary state were as if non existent for this secondary consciousness. The same held good of the primary consciousness: the two were working independently of each other, each synthetizing its own experience, each beginning at the place where it had left off. Neither of them knew of and felt subjectively the gap. There was a gap, only it was filled in by another moment consciousness of which the present functioning moment was not aware.

In cases of typical epilepsy subconscious states are sometimes found, states that constitute gaps in the activity of the normally working moment-consciousness. Thus in some cases of idiopathic epilepsy under my observation, the patients in the stuporous states succeeding the epileptic attack answer questions, but do not recognize me, nor do they know the nurse who takes care of them, although they can remember and recognize other names mentioned to them. In their normal state, however, they neither know of their attacks nor do they remember anything of the conversations and experimentations during the stuporous post-epileptic state. In other severe cases of epilepsy with frequent attacks of *grand mal* and *petit mal,* the patients during the periods of their stuporous post-epileptic states answer questions often mistaking persons and environment, referring to events and incidents of their early childhood. On emerging from their abnormal states, the patients are completely unaware of what had taken place, the epileptic attack with stuporous post-epileptic state forming a gap in the functional activity of his principal or upper moment-consciousness.

If we look at the moment from its subjective standpoint there may be consciousness of the gap bridging over the edges of the mental lesion, or such consciousness may be altogether lacking, the psychic edges of the mental lesion being closely unified in the synthetic activity of the temporarily arrested, but now once more functioning moment-consciousness. If we look at the objective side of the gap, we find that there may be total absence of all mental activity, no other moment coming up to fill the place of the one that has ceased functioning, or another moment may take the place of the one arrested in function, seemingly fill up the mental gap, and become submerged with the restitution of the arrested moment's activity. Not that the gap is really filled up objectively or subjectively; it is like the close successive manifestations of different individualities. The close observer can easily detect the arrest, the gap, the filling up of the gap with another moment's activity, and finally the restitution of the original temporarily arrested moment-consciousness. What is presented to cursory observation is apparent continuity of mental activity.

Mental gaps may be classified as follows:

Mental gap
- Subjective Standpoint
  - with consciousness of mental gap.
  - without consciousness of mental gap.
- Objective Standpoint
  - Absence of moment.
  - Presence of moment
    - Higher.
    - Lower.

When the principal moment becomes arrested in its activity and a new dominating moment takes it place in the formed gap, the type of the new moment is usually of a lower grade. The conditions that bring about an aggregation of moments are of such a nature as to allow of the activity of a high type of moment. Not appearing in the mental synthesis of the organization of moments characteristic of consciousness in the normal state, the moment is poor in content and simple in nature. Falling as it does outside the complex normal aggregate of moments, the moment lacks the harmony and balance in its psychomotor and psycho-physiological reactions, since the counteracting balancing and hence regulative psychomotor tendencies of other systems of moments are wanting.

A moment that enters into a highly complex aggregation of moments, when stimulated to activity, sets also other moments into functioning, moments that are closely associated with it and often of different and even contrary psychomotor and psycho-physiological reactions. Strengthening other systems against the lines of its own activity the moment is thus controlled, inhibited, and regulated in the very act of awakening to functioning activity. For it must be clearly understood that there is no special controlling agency somewhere in the mind sending out orders, mandates, inhibitions, like a despotically ruling autocrat, like a psycho-analytic censor, or like an omniscient, omnipotent, omnipresent, invisible deity. *The regulative, inhibiting control to which a moment is subject is in the mutual interrelation, balance, and harmony of the systems and constellations of moments, entering into an aggregate, and forming the organized activity of a highly complex moment-consciousness.*

When a moment becomes dissociated and isolated from other systems of moments, it loses its balance and being freed from control, manifests its psychomotor reactions in the full force of its original powers. The lack of control and the moment's energy of manifestations are just in proportion to the depth and extent of dissociation or of disaggregation of moments. *Dissociation and over-action are co-related.*

The intimate relation of dissociation and over-action is clearly seen in cases of so-called "psychic epilepsy." The dissociated subconscious states manifest themselves with an over-powering activity, with an energy that can neither be resisted nor controlled, they come like irresistible, uncontrollable, imperative impulses, which are closely related to them in nature. If, however, these states are brought out from the hidden subconscious depth from which they make invasions; if they are brought to light before the court of the upper consciousness one by one in hypnoidal states, and are forced to become associated with and synthetized into the principal moment-consciousness, the impetuosity and energy of their manifestations are gone. All my cases of dissociation give experimental confirmation of this law of dynamagenesis of dissociation.

The dissociated cluster, although inaccessible through the ordinary channels of intercommunications, on account of the disaggregation of the aggregate into which it enters as a constituent part, may still be reached through other channels, coming from other moment-aggregates. For a moment, or a combination of them forms a constituent part not only of one aggregate, but of many other aggregates. Loss of communication through a certain channel does not necessarily exclude loss of all communications. If the lost channel is habitual, the activity of the seemingly lost moments may be awakened through unhabitual channels.

If the moment cannot be set into activity by the organization of constellations constituting the conscious personality, on account of disaggregating processes, the moment may still be set into fuctioning activity through aggregates falling outside the focus of personality, but which work with that focus in close co-operation, namely the subconscious. In other words, in the process of disaggregation, conscious, or rather self-conscious experiences fall into the region of subconscious life; what is absent in personal thought may be present in impersonal, subconscious states. All psychopathic functional disturbances consist just in such an interrelation of mental aggregates; in the process of disaggregation of the self-conscious personality aggregates of moments drop out and fall into the domain of the subconscious. What disappears from attentive consciousness may fall into subconsciousness. The disaggregated moment, ceasing to enter into relations with the upper personal consciousness of the highly complex constellation, may still form a component of the lower aggregates of the subconscious.

CHAPTER X

THE MOMENT-THRESHOLD

TAKING an initial stimulus with its concomitant sensory effect as the starting point we add by degrees small unperceived stimuli until a point is reached when a barely perceptible change of the external stimulation is effected in consciousness. The sum of the differential stimuli up to the point where the perceptible change is produced is found out, and brought into relation with the quantity of the initial stimulus. Working with this method of least observable differences Weber succeeded in expressing the relation of the differential stimulus to sensation in the formula known as "Weber's law." Within certain limits, no matter what the absolute value of the stimulus be, the differential stimulus, or what is the same the barely sensible addition to the initial total stimulus, must bear the same proportion to the total stimulus. By many experiments Weber found that in the case of weight, for instance, the relation is one-third. Thus if the first weight be nine pounds the barely sensible addition will be one-third of nine, or three pounds; in twelve pounds the increment is one-third of twelve, or four pounds; in fifteen pounds the barely sensible increment is again one-third of the total stimulus that is one-third of fifteen, or five pounds, and so on.

Further investigations have shown that, within certain limits, there is for all the senses which admit of exact measurement a constantly uniform quantitative relation between the stimulus and the just noticeable stimulus-difference. Experimentation by different investigators have confirmed "Weber's law" for the different senses by showing that, within a certain range of intensities of stimuli, there is a more or less constant ratio between the increase of the stimulus necessary to produce a just noticeable difference of sensation and the total stimulus intensity. Thus, it has been shown that noise stimuli must increase by one-third; pressure stimuli by one-fortieth; stimuli of muscular sensations, such as lifting weights, by one-fortieth; achromatic light stimuli by one-hundredth. Weber in his paper *De Tactu* expressed his law as follows: *"In observando discrimine rerum inter se comparatarum non differentiam rerum, sed rationem differentiae ad magnitudinem rerum inter se comparatarum percipimus."*

Gustav Theodor Fechner, the founder of psychophysics and its methods, starting with Weber's law worked out a general formula for the quantitative relation between physical stimuli and sensations. Assuming that the just noticeable differences of sensation given by ascending or descending series of different stimuli to be equal units, he finds by means of different psycho-physical methods, first elaborated by him, the threshold of sensations or that stimulus which is just near the limit of giving rise to a sensory effect, but which is still not sufficient to awaken a sensation; in short, he finds the stimulus the correlating sensation of which is zero.

The *minimum* perceptible or stimulus-threshold is found by measurements of the different senses. Thus two parallel lines are for most people barely distinguishable when the distance between them subtends an angle of less than 60 seconds. In the sense of hearing the vibrations recurring between 30-35 per second are barely distinguishable. Below 16 vibrations per second no sensation of sound can be produced.

Thresholds have been similarly determined for all other sensations. Thus the sense of touch, when tested by the aesthesiometer, an unsatisfactory instrument, gives the average for the tip of the forefinger about 1.65 mm., on the back of the hand about 16.0 mm., Sensibility to pain as tested by the algeometer varies from 10 to 15 degrees. Sensitivity to smell varies with different substances; thus for smell of garlic sensitivity varies in detecting 1 part in 44,000 parts of water to one part in 57,000 parts of water; for oil of lemon from 1 to 116,000 to 1 to 280,000. Taste can detect the bitterness of quinine in a solution of 1 part quinine to about 400,000 to 459,000 of water; the sweetness of sugar can be detected in a solution of 1 part sugar to 200 of water; the taste of salt can be detected in a solution of 1 part salt to about 2,000 parts of water.

After discovering the zero point of sensation and the *minimum* perceptible he finds the constant ratio for the just noticeable difference. The *minimum* perceptible forms the unit of sensation. Each increase of the stimulus giving a just noticeable difference is counted as an additional sensation-unit to the total sum of sensations.

Let A be the threshold giving sensation zero, and let *r* be the constant ratio of increase then we have the following series of stimuli and their corresponding sensations:

Sensation o is given by stimulus A
“ 1 “ “ “ $(1+r)^1$
“ 2 “ “ “ $(1+r)^2$
“ 3 “ “ “ $(1+r)^3$
“ 3 “ “ “ $(1+r)^3$
“ n “ “ “ $(1+r)^n$

Thus we find that while the stimulus increases in a geometrical ratio, the sensation grows in an arithmetical ratio. The sensations stand therefore in the same relation as the logarithms to their numbers. Hence we may say that *sensation increases as the logarithm of the stimulus.* If S be the sensation, R the stimulus and C the magnitude of the constant ratio, then we have the following formulæ:

$$S=C \log. R.$$

This formula is known as “Fechner’s law.”

Fechner’s expression of Weber’s law is rather questionable. Fechner assumes that the just noticeable difference of different stimuli are qualitatively and quantitatively equal,—a dubious assumption. A third of an ounce added to an ounce does not feel the same as a third of eighteen pounds added to the same number of pounds, or as nine pounds added to twenty-seven pounds. These units even, if they have a quantitative expression, do not stand in a simple quantitative relation and are rather incommensurable.

Furthermore, it may even be considered that Fechner’s assumption is fundamentally wrong and unpsychological. In opposition to the first elementary principle of psychology Fechner tacitly postulates that sensations can be measured and that one sensation or a complex sensation is a multiple of another. Now the peculiar trait of the phenomena of mental life is essentially their qualitative character. Sensations are not quantities to be measured, but are essentially qualities. A strong sensation is not a weak sensation many times over, but its very strength, its intensity is its own separate individual quality constituting the essence of that particular sensation. An intense sensation of pure white is not a multiple of a weak sensation of grey just as the thought "nation" is not the thought "man" raised to the n^th^ degree.

In psychological investigations one must be careful not to confound the nature of the physical stimulus with that of the sensation. A physical stimulus can be measured quantitatively, but a sensation does not consist of quantitative units, and hence, is not measurable. The only relation that can be measured and expressed quantitatively is that between stimulus and physiological process, the physical concomitant of psychic states.

Whether or no we accept Fechner's statement of Weber's law we may safely assume that the threshold rises with successive stimulations. This law holds true of all life processes, from the life of an ameba to the life activity of a highly organized moment-consciousness. In the sphere of sensation we find such a rise of threshold. We are all acquainted with the fact that an additional candle or lamp, for instance, in a well lighted room does not produce the same sensory effect as when brought into a more or less dark room. An electric light in the sun is scarcely perceptible. An additional ounce to a lifted pound does not feel as heavy as when raised by itself. A sound added to another sound or noise, sounds less loud than when appearing isolated, or when the same sound is breaking upon silence.

The same relation holds true in the case of other senses.

This same truth is still more clearly brought out in the fact that, if we take a certain stimulus as a unit, giving rise to a definite sensation, then as we progressively ascend and add more and more units of the same stimulus, the intensity of stimulation is far from rising proportionately. If we take, for instance, the weight of an ounce as our unit of stimulation, then the successive moments of unit stimulations, that is, of ounces, will not give rise to as distinct and similar sensations as the initial sensation. The second ounce will give a sensation fainter than the first one, and the third fainter than the second, and so on until a point is reached when the sensation of an additional ounce will not at all be appreciated, will dwindle away and almost reach the zero point.

In the same way, if the pressure of a gramme is excited in the hand, successive increments of grammes will not in equal degree increase the sensory effect; the additional increments of grammes, though they are equal units of stimulation, give rise to fainter and fainter sensations, until finally all sensory appreciation of the added unit fades away and disappears. If the hand is immersed in water, say at the freezing point, an addition of ten degrees will be perceptibly appreciated, while successive increments of ten degrees each will be felt less and less, and finally will not be noticed and will be difficult to detect. In short, the threshold rises with the process stimulation.

To bring about a sensory response of an already stimulated sense-organ the intensity of the stimulus must be relatively increased. This is what constitutes Weber's law. The continuous progressive sensory response of a sense-organ requires a constant increase of stimulations which, within certain limits, bears a constant ratio to the total stimulus. This law is sometimes summed up by psychologists in the statement that "the increase of the stimulus necessary to produce an increase of the sensation bears a constant ratio to the total stimulus." Activity raises the threshold; it is the beginning of fatigue.

The rise of threshold after stimulation holds true in the whole domain of biological activity. If the gastrocnemius muscle of a frog, for instance, is stimulated by an electric current, the muscle, with each successive stimulation, responds less readily with a contraction, and this becomes more evident with the onset of fatigue. Pfiefer, in a series of extremely interesting experiments, has shown that spermatozoids of ferns are attracted by malic acid, the progressive response of attraction of the cell requiring a constant increase of the degree of concentration of the acid, the increment of stimulations, as in the case of sensation, bearing, within certain limits, a constant ratio to the total stimulus. The threshold rises with each successive stimulation.

The rise of thresholds increases with intensity and duration of stimulation as we approach the state of fatigue. Through the influence of exhaustion, fatigue, or the influence of toxic, autotoxic, emotional, and other stimulations, the thresholds of certain moments have been raised so that ordinary or even maximal stimuli can no longer call out any response. When such a rise of thresholds is present the moments with raised thresholds can no longer enter into association with systems of moments with which they are usually associated, and the result is dissociation, giving rise to the great multitude of phenomena of functional psychosis with a subconscious background, the extent of which depends on the number of raised thresholds, on the extent of the dissociation effected.

When a moment or aggregate of moments begins to function, it radiates stimulation to other moments or aggregates of moments. All the aggregates which these radiated stimulations reach do not equally begin to function. It will depend largely on the state of the aggregate and its threshold. If the radiated stimuli be minimal, the many aggregates that have a high threshold will not be effected at all. Furthermore, many aggregates whose arousal could otherwise be easily effected by the given stimulus may temporarily be in a condition in which their thresholds have become raised and thus fall outside the sphere of activity of the functioning aggregate. On the other hand, aggregates that are usually inaccessible to those minimal stimuli may under certain conditions be set into activity by minimal stimuli, if there is a lowering of the threshold of the total aggregate. Thus the aggregates set into activity by the functioning aggregate are conditioned by the rise and fall of their thresholds.

In case where the threshold of an aggregate is raised the radiated minimal stimuli coming from a particular functioning aggregate may become efficient and reach the threshold, when another aggregate begins to function simultaneously. This holds true even in the case when the minimal stimuli, coming from two different aggregates are just below the threshold-stimulus. Thus, under certain conditions, when visual stimuli are barely or not at all discernible, they can become intensified by re-enforcing them with auditory stimuli. This is commonly found in the mode of recovery of some forgotten name, or of some lapsed experience. We try to find the name and seek to come to it in one line of thought, but of no avail; new lines are attempted, and finally the combined activity of the systems reaches the lapsed aggregate whose threshold has become temporarily raised.

We find the same law further exemplified in the case of the infant under my observation. When with the nipple in his mouth the infant ceased nursing, the sucking movements could be induced again by stimulating some other sense-organ. The tactile, pressure, temperature, and taste stimuli coming from the nipple in the infant's mouth became insufficient to stimulate to activity the functioning aggregate of sucking movements, on account of its raised threshold; only additional stimulation could bring about a further functioning of the lapsed aggregate. This, of course, could also be effected by making the tactual and pressure stimuli more intense, such, for instance, as shaking the nipple while the infant kept it in its mouth. This increase of intensity, however, mainly indicates that the stimuli were no longer effective, and an additional stimulus was requisite, a stimulus that might come either from the same aggregate or from a totally different aggregate.

In the many cases of post-hypnotic amnesia, we find the same truth further illustrated. In the deeper stages of hypnosis, from which the subject awakens with no remembrance of what had occurred during the state the lapsed memories can be brought into the upper consciousness by plying the subject with many questions. During the trance or during the intermediate stages, with subsequent trance and suggested amnesia, the subject is made to perform a certain action,—to light and extinguish the gas four times in succession, or to open and close the door a certain number of times. The subject is then awakened from his trance; he remembers nothing of what has taken place. If he is asked point-blank whether he remembers any incidents of his hypnotic state, he answers with an emphatic negative. If now the subject is asked whether he knows how much two times two are or his attention is incidentally directed to the gas or to the door, he at once becomes reflective, the subconscious memories are on the way to surge up, and a few further indirect questions, the number depending on the depth of hypnosis, finally bring out the lost memories. The threshold that has risen at the end of the trance is stepped over by the combined effect of the many stimulations coming from different directions, and the subconsciously submerged moment or aggregate of moments surges up to the focus or nucleus of the upper consciousness.

Once a particular moment is stimulated in its appropriate way, it may go on developing, and usually does so by stimulating and setting into activity aggregates of moments associated with it, or may form new combinations of aggregates. The solution of a problem may present great difficulties, but once started on the appropriate line, the whole series of combination goes on unfolding, stimulating other moments and aggregates and forming more and more complex combinations. Thus, Archimedes, as the story runs, while in the bath, made the discovery of the law of specific gravity. According to the popular account Newton was led to his discovery of universal gravitation by the accidental fall of an apple. Hughes was started by the idea of symmetry in his discovery of the laws of crystallography. Goethe was led to his conception of metamorphosis and evolution by a skull on the plains of Italy. Darwin by reading Malthus' economical treatise on population was inspired to work out the great principles of the struggle for existence and natural selection. Myers was led by the greater redness of blood in the blood-vessels of tropical patients to his grand conceptions of transformation, equivalence, and conservation of energy. All these examples illustrate the fact that once a moment has been started it goes on developing by stimulating other cognate moments and aggregates to functioning activity.

The same condition is also found in psychopathic borderland states, such as dreams. In dreams a peripheral stimulus gives rise to sensations that start the activities of moments, which in turn give rise to phantastic combinations of different aggregates. This phantastic combination of aggregates, giving rise to the functioning of otherwise unusual, or what may be termed abnormal constellations, is largely due to the fact, of redistribution of thresholds in the dream state.

The dream state is characterized by a rise of the thresholds of moments and their aggregates that have been functioning during the waking states, the thresholds of these aggregates having been raised through activity. In the sleep state moments that have their thresholds relatively or absolutely lowered through inactivity, moments or aggregates that are unusual or have not been in use during the waking state, become aroused, and begin to function. Hence the arousal of hypnotic dream states reproducing long lapsed moments of child-life, hence the phantasms of the world of dreams.

CHAPTER XI

THE PROCESS OF MOMENT DISAGGREGATION

EACH stimulation leaves after it some moment-disaggregation, a condition that makes further disaggregation more difficult. The more intense the stimulation is, the more extensive and deeper is the disaggregation, and hence, the more difficult further disaggregation becomes. If the stimulation is continued or made highly intense, a point is soon reached beyond which no stimulation can pass without giving rise to disaggregation having as its manifestation the different forms of *pathological* mental dissociation. The pathological process underlying the phenomena of abnormal mental life is not essentially different from the one taking place in normal states. If difference there be, it is not certainly one of a quality, but of degree.

The more intense a stimulation is, the more extensive is the process of disaggregation, the higher mounts the moment-threshold giving rise to the different phenomenon of psycho-physiological and psychomotor dissociation. As expressed in a former work: "The process of disaggregation setting in under the action of strong and hurtful stimuli is not something new and different in kind from the usual; it is a continuation of the process of association and dissociation normally going on within the function and structure of higher constellations. The one process gradually passes into the other with the intensity of duration of the stimulus."

The process of disaggregation is a descending one, it proceeds from constellations to groups. Under the influence of strong stimulation such as mechanical and chemical agencies, and psychic affections, such as intense emotions of fear, anger, grief, anxiety, or worry, the degenerative process of disaggregation sets in, affecting first the higher aggregates and then with the continuity and intensity of the stimulations the process descends deeper and deeper affecting less complex aggregates, finally reaching the simplest aggregates of moments. The higher types of moments degenerate and fall to lower and lower stages of consciousness.

The law of disaggregation as that of degeneration in general is from the complex to the simple. The lower moments, on account of the simplicity of their organization, are more stable, and are in a better condition to resist the disaggregating action of hurtful stimulations. Furthermore, the lower and simpler an aggregate of moments is, the older it is, either phylogenetically or ontogenetically, and its stability is therefore more firmly assured by selection and adaptation. In the course of the life-existence of the individual and the species lower types of moments have come more often into activity, since the higher an aggregate is the later does it rise in the history of evolution. Hence moments that are not working smoothly and with little friction are continually weeded out.

This same process is going on not only in the history of the species by the eliminating action of natural selection, but also by the special adaptations brought about in the life experience of the individual. In phylogenesis the best and most firmly organized instincts survive, while in ontogenesis those habits are consciously or unconsciously selected which are most firmly established and are best adapted to the given end. At the same time the older an instinct is, the more thoroughly organized it becomes, the more is it enabled to withstand the onslaught of external hurtful stimuli. The same holds true in the case of habits. A habit of long standing is well organized, and it is often extremely difficult, if not impossible, to control.

Food instincts, sex instincts, social instincts, and personal moral life from an ascending series both as to time of appearance in the history of the species as well as complexity of structure and function. Food instincts in time and simplicity precede sex instincts, and sex instincts in their turn precede social instincts which antecede personal, moral life. Now we find that the instability is in the same ascending line. Food instincts are more stable than sex instincts, sex instincts are more stable than social instincts which are more firmly organized than a highly unified personal life, guided by a moral ideal. The structure and functions of the system of alimentation remain unchanged for ages; the sex instincts may become slightly modified for some period of time; the functions relating to social life vary from generation to generation, while the moral life guided by the moral ideal is highly individualized and personal.

In the downward course of mental disease-processes the degeneration is from the complex to the simple, from the stable to the unstable, from the highly organized to the lowly organized. In the different forms of mental diseases first the moral life, then the social instincts become affected, the patient becomes selfish, introspective, morally selfish, then loses all regard for others, becomes careless, wasteful and negligent of his vocations, life-work, and duties; his whole thought becomes concentrated on himself. In certain forms of mental alienation, such as melancholia and paranoia, the patient becomes suspicious of others, of his near and dear ones, becomes cruel and revengeful, sometimes ending by attacking his own friends and near relatives, and committing homicide. When the deterioration of personal moral life and social instincts is well under way, degeneration of other functions sets in,—the patient gives himself over to excesses, to all kinds of debauches, and indulges in the different forms of abnormal sexual practices. Only very late in the course of the disease are the food instincts in any way affected.

Even in the lighter forms of psychic degenerative forms that lie on the borderland of mental alienation, such, for instance, as are present in the various forms of psychopathic maladies we still find that the same relation holds good. Moral life is the first to be affected. Social instincts, follow, while disturbances of sex and food instincts set in very late in the course of the pathological process of disaggregation and degeneration.

In the mentally defective, such as in imbeciles, idiots, and cretins we once more find that our law holds good. The depth of the congenital mental degeneration is from moral to social, then to sex, and last to food instincts. In the imbecile, only the moral, social, and intellectual activities are affected, the imbecility being according to the depth of the degeneration, the other instincts are more or less normal. In the idiot and cretin the process of degeneration has gone still deeper and sex and food instincts with their psycho-physiological functions and psychomotor adjustments become affected, the idiocy being in proportion to the gravity of the affection.

The phenomena manifested under the action of narcosis go further to confirm the same point of view. Moral, personal life is the first to succumb, other activities follow in the order of their complexity and duration of function. In other words, the law of disaggregation or that of degeneration is from the complex to the simple, from the highly organized to the lowly organized, from the least stable to the most stable. This stability is proportionate to the complexity of moment aggregates, and the frequency and duration of their associative activity.

In habits, formed within the life time of the individual, the same law holds true. Old habits become inveterate, habits formed in childhood and perpetuated can hardly be eradicated, while those that are formed later in life become more easily dissolved. Complex habits formed in late life, relating to moral life and social intercourse, become dissolved at the first onset of the process of mental degeneration, while habits formed early in life, such as handling spoons, fork, and plate or dressing and buttoning the coat long resist the degenerative process. Paretics and patients of secondary dementia in general, though far advanced on the downward path of degeneration, are still for some time able to attend to the simpler functions of life activity, such as dressing and feeding. Once more we are confronted with facts pointing to the same law that the process of degeneration of which disaggregation constitutes a stage is from the highly to the lowly organized, from the complex to the simple.

If we observe more closely the history and stages of disaggregation, we find that, although the process itself is going on within the centre or nucleus of the aggregate, the course of the process is inverse, from the periphery to the centre. This law is really a corrolary of the first law of degeneration. For the nucleus of the moment aggregate usually consists of moments that have early become organized, and round which more moments gather from all sides, the aggregate finally attaining a high grade of organization. The further away from the centre or from the nucleus, the newer is the formation of the strata of moments, and the more unstable is their structural and functional relationship within the total aggregate. Hence, when the process of degeneration sets in affecting the controlling nucleus, the associative ties of moments within the aggregate become lowered, and the newest strata, the most remote from the nucleus are the first to be affected, the process passing from newer to older strata. In other words, the process of degeneration is from periphery to centre.

In the building up of a moment-aggregate the early deposits are less complex than the later deposits which are not as yet well organized by use and adaptation. The child under my observation learned early that the shining point yonder in the "ky" (sky) is "venu(s) the (s) tar," and when absent it is "hidden by a c(l)oud." This knowledge is certainly extremely meagre, but still it forms the nucleus round which gradually more knowledge will become formed and organized. The child will learn the dimensions of the planet, its distance from the earth, its orbit, its relation as a member within the solar system, relations that may be extended endlessly, making the whole moment-aggregate more and more highly complex and unstable.

If we turn to motor adaptations, we find a similar course of development. It took the infant time before out of the aimless series of spontaneous motor reactions some definite adaptations emerged relative to external visual stimuli, so that he learned to grasp the object yonder. These grasping motor reactions are at first crude and inexact. The distance of objects is often mistaken, and the child stretches his hand to fetch distant objects, while small objects cannot be picked up; the hand often goes in the wrong direction and objects are often dropped, because the reactions are not exact and steady. Still these grasping movements form the nucleus for the formation of new and more complex strata of motor reactions. He learns the delicate adaptations of grasping small objects and the fine adjustments of producing a series of highly complex and extremely delicate motor reactions, such for instance as one finds in the handling of instruments, reading, writing in the execution of musical pieces, in singing, and piano playing. All these motor reactions as they become more complex and delicate are further and further removed from the organized nucleus.

What happens now in the descending process of dissolution? The reverse process takes place. The more complex the psycho-motor structure is, and the further it is removed from the original nucleus, the more easily does it become disintegrated in the downward course of the process of degeneration. In the different forms of mental diseases, such as the various types of mania melancholia, paranoia, general paresis, primary dementia, dementia praecox, senile dementia, and in all those chronic forms that end in secondary dementia, adaptations and acquisitions further removed from the original nucleus, constituting the simple relations of things acquired in early youth and childhood, gradually become disintegrated. The more remote the stratum is from the central nucleus the earlier does dissolution set in.

With the setting in of the process of dissolution the scientist, the professor, the student loses by degrees the lately acquired wealth of knowledge, the complex and delicately balanced conceptual structure of scientific relationship; the more remotely related to the original nucleus of sense experience is the first to become shaken and tumble down. When the degenerative process has gone far enough, the original meagre nucleus of sense-experience becomes disintegrated in its turn.

With the onset of the process of degeneration the banker, the business man, the speculator, gradually begin to lose the understanding of those speculative aspects of business adaptations and adjustments that are remotely related to the original nucleus of self-preservation. With the further advance of the process of disintegration, more stable strata, more nearly related to the original nucleus become affected, until finally the nucleus itself is reached and its constituents are affected, the patient is unable to take care of himself.

In motor reactions we find that the same law holds true. The finer, the more complex a given activity is, the more remote it is from the primary nucleus of motor adaptations, the easier and sooner does it become disintegrated in the course of the pathological process. The musician, the virtuoso loses the power of infusing harmony, life, and emotion into the play; the painter loses control over his brush, the singer over his voice; the watchmaker, or the mechanician is unable to regulate the fine movements of the spring, the wheels of the delicate mechanism, and the mechanic is unable to handle his instruments. Drawing deteriorates, writing is impaired and defective. The liquid "r" a sound which children acquire late becomes difficult, if not impossible to pronounce. The speech test of general paralysis is well known. The patient is unable to repeat such a simple formula as "round about the rugged rock the ragged rascal ran,". or "truly rural."

With the further advance of the process, such simple actions as picking up a pin, or threading a needle are executed with great difficulty, and much hesitation. To produce a straight line or to draw a circle becomes impossible. Involuntary tremor is predominant, a tremor, the rhythmical regularity of which becomes fully manifested in senile degeneration, and which is also observed, though without its rhythmical regularity, on the very eve of mental life, in infancy.

CHAPTER XII

REPRODUCTION AND THE REFLEX MOMENT

WE have described the moment-consciousness as being stimulated to activity, as emerging, as assimilating new material, as growing and developing, as passing through many stages in the history of its individual evolution and dissolution. All this tacitly implies another characteristic besides the ones found as belonging to the nature of the moment. The moment-consciousness has the function of reproduction. We have incidentally discussed reproduction of the moment-consciousness, but we have not studied this character more closely from the standpoint of the moment's general nature.

A close inspection of the moment-consciousness reveals the fact that every moment-consciousness can be reproduced as long as it is not destroyed, as long as it is not dissolved into its constituent elements. For as long as the moment exists, each time when it is stimulated to activity the manifestation of its content, both sensory and motor, is *ipso facto* the moment's reproduction. What remains for us to investigate is the various modes and forms of reproduction, and also the conditions under which they occur.

The simplest case we may suppose is a moment-consciousness set into activity by an appropriate stimulus. This activity runs a certain course and comes to an end; it ceases when the purpose of the moment is accomplished. A second stimulus will call forth a repetition of the activity, a recurrence of the phenomena; a third, a fourth, a fifth stimulus of the same kind will each time call to life the moment-consciousness; the moment will be *produced* again, will be *reproduced.* A repetition of the specific appropriate stimulus will be followed by a reproduction of the moment.

The reappearance of the moment presents a series of moments situated at a distance of different time intervals. The members of this series are disconnected, inasmuch as each member does not contain the fact of its previous appearance. The present functioning activity is not felt in the moment by some modification effected in the content, it is not cognized as a reappearance. This is impossible from the very character of this form of reproduction, since the emerging moment is supposed to appear with an unchanged content, while modifications, feeling, and cognition of previous appearances require something added to the moment which makes it different in content. The members in such a series are disconnected and do not enter into relation. Each moment presents a separate beat of consciousness. The previous appearances of the moment are not represented in its subsequent appearances; each one stands by itself. No modification is produced in the organization of the moment by the previous history of its life activity, no "trace" is left by and of former experience. On each occasion the same psychic content is reproduced.

Since the form of consciousness, now under consideration, is of such a nature as to have no modification left by each separate beat of the moment, no connections are formed by the fact of functioning. Only that connection exists which is given in the organic constitution. In other words, we may say that a being with such a type of moment-consciousness does not profit by individual experience; it does not, and cannot get any acquired characters during its individual life existence. It lives only by what has been obtained by the process of natural selection, during the life history of the species.

Primary sensory elements are certainly present, but secondary sensory elements may be absent as it depends entirely as to whether such connections requisite for secondary sensory elements have been established by variation and natural selection in the phylogenetic history of the moment. We may possibly say that while such connections are absent in a lower stage of the moment, they are present in a higher stage. Both stages, however, lack the formation of acquired characters during their individual history.

Such states of the moment consciousness may be largely hypothetical, but they are probably present in the very lowest representatives in the scale of evolution. The throwing out of pseudopodia in the amoeba are as perfect in the daughter amoeba as in the mother before fusion has taken place. The young vorticella is just as efficient as its parent in its sudden spring-like reactions of contracture and expansion, both of its body and of its long attached thread-like fibre. What is present is in all probability some primitive primary psycho-biological element, a germ out of which the elements of the higher forms of psychic life have differentiated.

The structure and functions of the higher forms of life have become differentiated out of the homogeneous activity of lower forms. The sensory nerve cell, the recipient of the stimulation, like the muscle cell, the reagent to stimuli, has evolved from the primitive cell by greater and greater differentiation, both of structure and function. In the crustaceans, invertebrates, and lower vertebrates where motor reactions to stimuli are more or less complex and varied, the sensory aspect of the moment is probably correspondingly complicated,—organic connections are present giving rise to secondary sensory elements, constituting the material of perceptual life.

The soft-bodied hermit crab as soon as he hatches out from the egg looks for a shell to fit his body in, to protect it from danger, and does the fitting and measuring of the shell with as delicate a nicety and circumspection as his seemingly more experienced older relatives. As a matter of fact, experience does not count here,—a baby hermit-crab is as learned as its parent. Not even organic modifications are acquired, the organization or mechanism is ready, and the first appropriate stimulus sets into activity reactions to external conditions in the most perfect way of which this organization is capable. The butterfly, the ant, the bee on emerging from their chrysalis are as perfect in their reactions as any of the adult individuals. Acquired characters count for nothing, inherited organization is everything.

In the lower vertebrates such as fishes, acquired characters, modifications formed during the life time of the individual begin to appear, but this is only in its germ; here too inherited organization is everything. The mechanism is ready and perfect as soon as it comes into life, and enters into relation with the condition of the external environment. The moment-consciousness concomitant with such a type of organization is perfect from the start and has reached its maturity at birth. The contents of the moment cannot be enriched, the internal relations cannot be improved,—no modifications can be brought about in its sensory response and motor reactions. External stimuli set the organization into activity with an unvaried psychic content, with an unalterable psycho-physiological structure and motor manifestations. The content of such a moment is fixed and unalterable. This low stage differs but little from reflex activity; in fact, such a type of psychosis may be termed *reflex moment-consciousness.*

CHAPTER XIII

DESULTORY CONSCIOUSNESS

THE characteristic feature of the reflex moment-consciousness is its activity on single lines of sensori-motor reaction. This is well seen in the more differentiated form of this stage of psycho-physiological organization. In the ascidian, for instance, we meet with one sensory nerve cell connected with the muscular reacting apparatus. This is of the nature of reflex action found also in the higher representatives of the life series. In the higher forms of the fixed moment some connections are formed, several sensory ganglia are connected; the action may then become more varied. In the still higher stages of the same form many systems of ganglia of several organs become connected, thus giving rise to a highly differentiated sensori-motor apparatus.

At this stage secondary sensory elements enter into the content synthetized by the moment-consciousness. What, however, characterizes all these forms as belonging to the same type of moment-consciousness, is the fact of their being unmodifiable, fixed in their organization. The moment does not get modified by its recurrent manifestations. The organization does not get improved by repetition. Things are in *statu quo* since the time of birth. The moment, not being modifiable by its previous occurrence, when stimulated, emerges each time with an unchangeable content. Each time the moment recurs, it shows not the slightest trace of its former life activity.

The various reproductions of this type of moment-consciousness presents a disconnected series. The moment at each time of its occurrence may, psychologically, be regarded as an entirely new moment, inasmuch as it bears no trace of its having been in activity once before. To an objective observer confronted for the first time with this type of moment, the latter appears, and rightly so, as if it were just come into the world. The moment is regarded as reproduced, not by a mark inherent in its constitution, due to the fact of its recurrence, but by modifications in the observer. In short, the moment in its recurrent manifestations presents a disconnected series.

If we look at consciousness from the standpoint of serial relationship, then the disconnected moments in the series appear as separate, as isolated. This isolation of the members in the series is the chief characteristic of this type of moment-consciousness which may then be termed *desultory consciousness*.

The moment consciousness of the desultory type may also be represented in a more hypothetical form. There may be a type of consciousness in which the moment does not recur at all. Each moment appears and vanishes, never to come again, and is followed by another moment of a totally different content. The moments have no relation to one another. The antecedent moment is totally, and we may say absolutely disconnected from the subsequent moment. The series of moments appearing are unrelated and are also different in content. The moments appear like a series of successive bubbles, each bubble bursting, vanishing, giving place to a new bubble, and so on. There is no connection between the successive moments, neither in relation nor in matter. Such a moment is a purely desultory form of consciousness and may possibly be present in the completely unorganized, non-nucleated protoplasm.

The lack of a definite stable organization may result in an indefinite mass of sensory responses and motor reactions, hence with a changeable, indefinite psychic content. When life becomes more differentiated and organization appears, then the psychic content becomes organized in a *recurrent desultory moment-consciousness,* with a more or less definite content. *Amorphous life has as its concomitant amorphous psychosis.*

Reproduction probably begins with the more or less definite formation of the moment and its nuclear element. When the moment-consciousness appears to be definitely organized then reproduction is present. In other words, reproduction is a fundamental characteristic of the *formed* moment-consciousness. The reproduction of the moment, the type of which we have just analysed, is fixed in its activity, unmodifiable in its function from the very start of its entering into relations with the external environment. This type of moment is of such a nature as not to admit of further growth after it has come into the world and has begun to function; it admits of no improvement, of no modification.

It is interesting to find that such a type of moment-consciousness is not altogether absent in the very highest forms of psychic life. Under certain conditions we meet in the higher mental types with a form of moment-consciousness closely resembling the fixed moments of the lower forms of psychic life. In the degenerative states of idiocy, we find the moment to be of the desultory type. The moment is fixed, admits of no further growth; the moment recurring at more or less regular intervals. Such are the rhythmical movements often observed in low types of idiots, movements that are closely allied to those of the vorticella type.

In the pathological states known as hypnoidic, found in many forms of amnesia, in somnambulistic states, in the so-called "psychic equivalents" of epilepsy and in the pure "psychic epilepsies," the moment possesses a definite content, highly organized, of course, considering the stage in which it occurs, but essentially fixed in its character, not capable, not admitting of any changes, of any improvements. The hypnoidic state resembles more the desultory reproductive movement of the second stage with a highly varied and differentiated content, but otherwise fixed in character. The hypnoidic state, whenever it appears, recurs with a content unchangeable, unmodified by the previous repetitions; it acquires no new, no modified characters in the course of its reproductions. Previous reproductions leave no trace behind. The hypnoidic state always appears fresh and new, as if coming into the world for the first time, not bearing the stamp of its life history.

An inspection of the hypnoidic state, when it occurs, does not in the least reveal the fact of its having had a past, of its having similarly appeared once before. The hypnoidic state is the past itself, and nothing more than the past. Like the moment-consciousness of the crustacean, or that of the invertebrate, it reacts to the stimuli of the external environment with a given moment-content, with a definite set of highly complicated sensori-motor reactions. From this standpoint the hypnoidic state may be regarded as a reversion to a primitive form of psychic life, it is a reversion to the fixed moment of the desultory type.

CHAPTER XIV

THE SYNTHETIC MOMENT AND ITS REPRODUCTION

IN our last analysis we have examined the trait of reproduction in the lowest types of psychic life, such as the different forms of desultory moment-consciousness. We may now turn to the higher types of moments and show that in them, too, the same fundamental character is present, only of course, becoming more complicated and more differentiated with the progress of psychic life. The moment which we have thus far studied is one in which growth is impossible as the reproduction of the moment does not embody the previous manifestations of the moment. In other words, the type examined is of such a character as only to synthetize content within the occurring moment, but it lacks synthesis of moments themselves. The reproduction is of inherited content, it is phylogenetic in nature. We turn now to higher types of moments in which content and moments are synthetized alike. Such a type of psychic activity may be termed *synthetic consciousness,* and its moment the *synthetic moment-consciousness.*

The reproduction of the synthetic moment-consciousness is not isolated, it stands in relation to the antecedent and subsequent moments. Each reproduction modifies the next one to a certain degree, however, slight that may be. The moment is essentially modifiable and capable of improvement up to a certain point of which its internal organization permits. The reproduction of the synthetic type bears in its organization the stamp of its previous life history. *We may say that just as the moment of the desultory type is an epitome of phylogenetic evolution, so is the moment of the synthetic type an epitome of ontogenetic development.*

In its lowest form the synthetic moment undergoes modification by the fact of previous functioning activity. The synthetic moment in its reproduction may be represented in a series of moments, each reproduced moment is modified by the preceding moment and in its turn modifies the succeeding moment. The series is interrelated and interconnected. Each link in the series includes the previous link, and is in its turn included by the succeeding link. Each member in the series possesses itself of the wealth and being of its predecessor, and is itself inherited by its successor. The whole series is really a history of the continued growth and development of the one moment-consciousness passing through various stages in the way of reaching maturity, both in structure and function.

It is true that once the synthetic moment has reached its maturity it may go on reproducing in the same way as the desultory moment, but the element of modification is still present, although it cannot be so clearly seen by a superficial examination. To detect this element of modifying influence of one reproduction on the succeeding one, we must watch the moment closely and, if possible, experiment on it. As long as the content of the moment remains relatively unchanged, no change is observed in its reproductions after having reached the acme of development. Should, however, some change be introduced during the functioning of the moment, at once this modification reappears on the reproduction of the moment.

A change may be introduced in the moment in a somewhat different way, namely, by letting it rest for a time longer than requisite for its restitution by arresting its activity. This introduces a change in the internal constitution of the moment, weakening the intensity of its activity, or loosening the co-ordination of its internal relationship. The co-ordination and activity of the psychic elements synthetized in the moment become shaken; the stability of the moment is interfered with; its equilibrium gained in growth and development by the successive series of modifications is partially overthrown; the moment becomes unstable, its structure and function regress and fall back a few steps lower in the course of its adaptation to the conditions of the external environment, adaptations acquired during the life history of its individual development. The mere arrest of the moment's function for a shorter or longer period at once tells on the subsequent reproduction of the moment. The function of the moment succeeding the period of arrest is less perfect; the moment is less adapted in its reactions to external stimuli. These facts, it seems, clearly indicate that in reaching maturity the moment has not lost its capacity for adaptability and modification.

Furthermore, the fact of arrest with subsequent modification and degradation of function shows that the adaptation reached by the moment in its mature state is really kept in stable equilibrium by its more or less continued reproduction. Each reproduction of the moment is indispensable to the existence of the next one, and manifests its influence by maintaining the succeeding moment in the stage of maturity reached by the long series of modifications.

The moment of the synthetic type profits by experience, the moment of the desultory type does not. We realize now the difference between the moment of the desultory type and the moment of the synthetic type. The desultory reproductive moment is highly stable in its organization, formed by variations and the iron hand of natural selection; it is crystalized in character, function does not effect its organization. The reproductive moment of the synthetic type, however, while having on the one hand as its basis a functioning apparatus, formed in the course of phylogenesis, has on the other hand a large capacity for modification, and is mainly built up by function; it is profoundly modified by its own functioning activity. In other words, while the moment of the desultory type is entirely *organic* in its nature, the moment of the synthetic type is mainly of a *functional* character. The contrast between the two types of moment may be summarized in the one phrase: "function vs. structure." The aphorism "function maketh structure" holds good only of the synthetic moment.

In speaking of the fact that the synthetic moment profits by its experience, while the desultory moment does not, we must be guarded against the term 'experience.' For it implies a psychic state belonging to a higher type of moment-consciousness, and it is misleading, unless the term be qualified, when used for a lower type of psychic life. Experience would imply that the moment under consideration has an idea of its state and remembering it takes on another occasion advantage of its acquired knowledge. Nothing of the kind occurs in the synthetic type. The synthetic moment has no knowledge of what is taking place in its psychic activity, it is not conscious of the states it is living through. The only knowledge the synthetic moment possesses is the one characteristic of sensory life in general,—it is somewhat like what some writers term knowledge of acquaintance. The content of the synthetic moment only approaches to this form of knowledge, which is really different in nature, inasmuch as "knowledge of acquaintance" is only a lower stage of mental activity characteristic of a higher type of moment than the one under investigation. Knowledge of acquaintance implies a sensation also the free image and free idea of that sensation. The synthetic type on the contrary has only the sensation, the free image and idea are totally wanting.

The psychic life of the infant is probably the nearest that comes up to the nature of knowledge or experience characteristic of the synthetic moment. I say that the infant's psychic life comes nearest to that of the synthetic moment, but still the two are not exactly the same. In the infant's consciousness, however young, free images and ideas are potential and on the way to germinate, while the synthetic moment lacks this potentiality, inasmuch as the synthetic moment reaches its full development without giving rise to free psychic elements. The consciousness of the infant is a low stage of a high type of moment-consciousness; while the synthetic consciousness is a high stage of a low type of moment-consciousness. The high stage of a low type and the low stage of a high type may be respectively illustrated by the algebraic formulae: $(a+b)^n$ and $(a+b+c+d+e+f+\ldots\ldots)^1$ where a, b, c, d .... are the functions of the moment and n the degree of development of the moment.

The consciousness of the young infant as closely resembles the synthetic moment as the fish stage of the human embryo resembles the fish itself. Still the analogy is useful as it gives a closer insight into the constitution and relations of the two types of moment-consciousness. The infant in its psychic growth no doubt passes through the inferior types of moment-consciousness, but in a most general and sketchy form. The ontogenesis of psychic life is probably as much an epitome of its phylogenesis as the ontogenesis of biosis is an epitome of its phylogenesis. Both give a most generalized epitome modified by adaptations and by the specific type of organization in which the ontogenetic evolution is taking place.

CHAPTER XV

THE ACCUMULATIVE CHARACTER OF THE SYNTHETIC MOMENT

THE experience of the synthetic moment means not consciousness of the presented content, but simply modification of psychic function. The experience of the functioning moment influences the content on its next reproduction If A is the original functioning synthetic moment and b_1, b_2, b_3, b_4 its modifications due to the functioning activity, then the successive reproductions of the moment may be represented by the following formula: A, A_1b_1, A_2b_2, A_3b_3, A_4b_4, A_5b_5 until it reaches its maturity or state of stable equilibrium, say A_nb_n. The whole series may be represented by the formula: A, A_1b_1, A_2b_2, A_3b_3—A_nb_n. Each member of the series reproduces in an epitomized form all the members that preceded it and the last one, the mature moment in its state of equilibrium, representing an epitome of the whole series. The series in its successive stages represents the life history of the growth and development of the synthetic moment.

Concrete examples may help to make the matter clearer. The fish in making repeated attacks on another fish contained in the same tank and meeting repeatedly with failures will finally desist from its attempts. The fish that has been snapped at many times and has escaped will keep away from the dangerous place. This does not mean that the fish remembers its experiences, that it is conscious of its failures, of the futility of its attacks, or that it knows that yonder is a dangerous place which is to be avoided. The whole matter is far simpler. Each repeated failure modifies the moment-consciousness so that the content slightly changes, the unsuccessful motor reactions diminish and finally disappear, while in their place others are substituted. Thus the fish on perceiving its prey may either avoid it and swim away, or it may keep quiet simply following the prey with its eye.

The chick on emerging from the egg may peck at its excrements a few times, but each time the disgust experienced modifies the moment. The reaction of the next moment, when confronted with the same stimulus, becomes less vigorous and finally with the reproductions of the moment, the adaptation becomes so perfect that the mere sight of the disagreeable object suffices to repel the chick and make it turn aside. Here once more it is not that the chick remembers the disgust, and as soon as it is confronted with its excrements, its straightway remembers the disgust it has experienced. This is to ascribe a high form of consciousness to a moment of a low type. The process that has taken place is simpler. The disgust experienced has so modified the sensory motor reactions of the moment that finally different reactions result in response to definite stimulations under definite conditions.

The same holds true of the cat, and the dog. The first weeks of their life kittens or puppies are unable to walk well, they seem to pick their way continuously; gradually they learn to walk and run; the dog soon begins to race and the cat becomes graceful and nimble in its movements. It will certainly be agreed that young puppies or young kittens do not actually remember the steps of their experiences. What happens is that the activity of the organs, along with the growth of the corresponding motor cells, so modifies the function that the walking becomes more and more perfect until it reaches perfect adaptation.

The same thing occurs in the training of brutes. It is not that the brute remembers the steps of the process, and knows how improvement has taken place by a given way of action. In the process of training modifications are brought about by each successive reproduction of the moments in response to the action of external stimuli. Modifications due to successful chance action, being more satisfactory to the brute, are stronger and modify the moment in their own direction, while unsuccessful reactions tend to drop out and thus adaptation, improvement is brought about. The cat in scratching for the door to open it scratches at first aimlessly and does not open,—the actions are unsuccessful. Should the cat happen to scratch the handle and open the door, which certainly is probable, considering the activity of the cat's paw, the result is satisfactory. The repetitions of such chance actions will gradually so modify the cat's scratching that it will become more and more definite. The successful actions alone will be repeated, the unsuccessful will drop out. Finally the adaptation will become so perfect that the sight of the closed door will at once result in the reaction of scratching the handle and opening the door.

The young bird is brought in the world in a rather helpless condition as to movement of co-ordination, especially flying movements. The apparatus for flying is undeveloped, but it soon reaches its perfect adaptation through activity, exercise, practice, that modify both structure and function. The bird does not remember the steps of its acquisitions and profits by its failures so as to make consciously better and more adaptive movements. The process that takes place is far more simple: Each act of functioning produces and reproduces modifications, both in structure and function, until the apparatus and its activity reach perfect adaptation. The total moment is modified on each reproduction until a point is reached where further growth and development ceases and maturity of function is established.

The same holds true in the case of the child. The child on learning to sit is doing it in a very clumsy fashion, tumbles over every time; it must be supported by pillows to keep it in the same position and also to prevent it from being hurt. The structure works imperfectly. The exercise of the apparatus, along with its further growth, brings about a more perfect adaptation, and the child finally learns to maintain its equilibrium when in the sitting posture. The standing upright passes through a similar history. When the coordinating apparatus for walking begins to appear, it works at first in a very awkward manner. The child first walks by holding on to some objects, such as chairs, or the wall, or the hand of his parent and nurse. When he makes a step all by himself, he is almost frightened, and when left alone often cries.

Practice and growth of the walking apparatus becomes more and more perfect. The child makes two or three steps hesitatingly, stops, asks for help and support. Gradually his movements become more certain, and more steps are taken until finally the child learns to walk, still imperfectly, in the waddling fashion characteristic of young age. The walking apparatus grows and keeps on functioning. The function reacts on the further growth making the movements more and more perfect. Each attempt makes the next one easier. Adaptations develop not only by the mere growth of the apparatus, but also by function. In fact function largely determines the growth of the apparatus.

It must, however, be pointed out that the example taken from baby life may be used only as an illustration of the way the synthetic moment grows by function or reproduction. The child's growth does not exactly follow the same lines as those of the synthetic moment, since the psychic life of man develops on a higher level belonging to a higher type of moment. In the efforts of the baby to walk some germs of deliberation and reflection may be observed, but it is hardly probable that these elements are present in the first attempts of the cat to walk or of the bird to fly. The moment of the synthetic type grows by simple modifications of its function brought about by its repeated reproductions.

The modifications, however, of the moment's function are not mere chance modifications. The function, is modified on a definite line in the direction of more perfect adaptation.

Reactions to stimuli coming from the external environment become more defined until a definite set of reactions is established. This involves the selective activity of the moment. Certain fit reactions are selected and assimilated by the moment, while others, unfit are rejected. This, however, is a trait which is characteristic not only of the synthetic moment, but of the moment-consciousness in general.

CHAPTER XVI

THE SIMPLE AND COMPOUND SYNTHETIC MOMENT

A FURTHER examination of the synthetic moment reveals two stages, a lower and a higher. The moment may consist of a nucleus having only one kind of sensory elements and of a net-work of subsidiary relations belonging to the domain of the same sensory elements. The animal may trace its food or its prey by the sense of smell alone. This act becomes more perfect with further function. The modifications accumulate in the domain of the same sense-element and the adaptations occur in a relatively simple one-sided sensori-motor apparatus. Modifications of such a character occur phylogenetically in the sensory apparatus of the lower invertebrates, such as crustacea, arthropodes, and possibly also in the lower forms of vertebrates. Such a phylogenetic accumulation in these low types of moments is formed only by variation and natural selection, while in the case of the synthetic moment the accumulation is formed during the life history of the particular individual. The one is *racial acquisition,* the other is *individual experience.* Both, however, may agree in the general character of the modification effected. The modifications are in one sensory organ, and the psychic moment-content consists of similar sense-elements. Such a stage of psychic activity may be termed *simple accumulative synthetic moment-consciousness.*

If A represents the first occurrence of the moment, the first functioning of the simple sensori-motor apparatus as given by phylogenesis, and if *a* be the modification effected, then the accumulative process may be represented by the powers of *a;* thus the first will be A, the next is A_1a^1, the following is A_2a^2, then A_3a and so on. The total process to the point of maturity may be represented by the following formula: A, A_1a^1, A_2a^2, A_3a^3, A_4a^4, ... A_na^n. A_na^n represents the highest stage of perfection reached by the simple accumulative synthetic moment.

The synthetic moment may also have a higher stage where many different sensori-motor elements are synthetized, the accumulative modifications occur along different lines of sensory responses and motor reactions. The moment reaches here the highest form of consciousness as mere perceptual in character. The fish perceives its prey not only by smell, but also by sight along with muscular and touch sensations; all of them go to form the percept of the prey yonder, as far as perception of fish space is concerned.

The American flounder of the Atlantic coast may be taken as an illustration. Although the flounder is perfectly quiet, almost lying motionless at the bottom of the tank, only occasionally moving his small protruding eye, no sooner is some small fly thrown into the tank, than the flounder at once darts in that direction, and attacks its prey with a snap. I wanted to find out how far visual perception is concerned in the tracing of the prey, and how far sense of smell and touch are important in this particular fish at least. The flounder was deprived of its organs of sight, and after having been given about twenty-four hours time to recover from the effects of the operation, it was thrown into a tank teeming with little fishes on which it feeds.

The flounder settled to the bottom, but in about a few minutes raised itself in the attitude of attack, so highly characteristic of this species, either smelling the little ones or feeling the vibrations made in the water by the swimming movements of the little fish; it made a dart in the direction of a whole mass of them, but missed. This has been repeated many times over, the flounder failing every time and only snapping water or air bubbles. The little folk soon became emboldened and avoiding his front they came from behind pecking at his blind eye. The flounder could not reach these little fellows.

Moreover, the bottom of the tank where the blind flounder was lying was full of small sea-robins which like to walk on the bottom with their highly sensitive leg-feelers. The blind flounder did not attack them, although with his eyes in good order, he would have instantly attacked the sea-robins. It appears then that the flounder tracks its prey by the sense of sight mainly, while the other senses are indefinite guides. Still the other senses seem to take an active part in tracing the prey, as the blind flounder was most of the time in an attitude of attack. Evidently he was smelling the prey or feeling its movements all the time and was aware of its presence, though the senses without sight could not give him the definite direction in which the prey was to be found. In other words, the other senses awaken only the sensations of presence of the food, but do not give its direction and location.

It is highly probable, then, as far as we can infer from this experiment as to the psychic state of the fish, that the flounder does not get a definite percept, unless many different sensory elements are combined in a synthesis giving rise to a well defined motor reaction of more or less perfect adaptation. The synthetic moment, then, in this particular species at least, seems to be of a highly complex character, inasmuch as many different sense-elements go to make up its content.

Similarly it is affirmed of the sea-robin that, if its delicate leg-feelers are cut off, the fish is unable to feed. If that be true, then the touch sensation is important here and enters as a determining element in the moment along with other elements coming from other sense-organs. In the dog smell is mainly the determining factor, but the functioning of other senses are requisite to form secondary sensory elements; here too the moment is made up of many series of various sense-elements. In the bird, in the ape, in the man, sight is the chief element in perception, but the percept arises not from visual elements alone, but from a synthesis of a multitude of elements coming from other sense-organs the visual elements often taking the lead.

From a purely biological standpoint we can understand the importance of the leading part played by the visual elements in the psychic life of the higher vertebrates and especially of that of man. It is of the greatest advantage in the struggle for existence to develop a sense organ that admits of the most delicate objective discrimination. No other senses, not even that of hearing, are so free from the general organic sensation as the sense of sight. Hence the sensory elements coming from the sense organs other than sight are *confused* and lack the objective clearness characteristic of the sense of sight. The visual sense further is of the highest sensitivity to extremely low and distant stimulations such as are produced by ether waves. An animal therefore that will by natural selection have its moment consciousness organized round a nucleus of highest sensitivity such as that of visual sense elements will have better chances to survive and succeed in the struggle for existence. Still, even in man the elements coming from other sense organs may become predominating in the nucleus and give rise to various mental types, such as audiles, motiles, and so on. This holds specially true of the higher representative elements. A moment-consciousness that has a varied content of many different sensory-elements synthetized in one compound, accompanied on the motor side with a complex of motor reactions may be termed *compound synthetic moment-consciousness.*

The compound synthetic moment-consciousness is characterized in its series of accumulations in the same way as is the simple synthetic moment, the only difference being the complexity of the lines of accumulations. The accumulated sensori-elements of the same kind or of the same sense-organ form primary compounds among themselves and secondary or double and treble compounds with other compounded series of sensory elements. If V represents the original primary visual sensory element, *T* tactual, *A* auditory, *O* olfactory, and *M* muscular sensory elements, then the series for the development of the highly adapted A aspect of the moment may be represented by the formula already given, in our analysis, namely: A, A_1a^1, A_2a^2, A_3a^3, A_4a^4. . . . A_na^n. The V aspect of the moment similarly gives V, V_1v^1, V_2v^2, V_3v^3, V_4v^4. . . . V_nV^n.

The T, O, and M series will give respectively the following formulæ:

$T,\ T_1t,\ T_2t^2,\ T_3t^3,\ T_4t^4 \ldots\ldots T_{10}t^{10} \qquad T_nt^n.$
$O,\ O_1o,\ O_2o^2,\ O_3o^3,\ O_4o^4 \ldots\ldots O_{10}o^{10} \qquad O_no^n.$
$M, M_1m, M_2m^2, M_3m^3, M_4m^4 \ldots\ldots M_{10}m^{10} \ldots M_nm^n.$

The process of composition begins not at the first members of the series, but rather further on. Some accumulations must be made first in each series separately before combinations of the different series can take place. For simplicity sake we may postulate that the process of composition of all lines begins in each alike, although this may not be the case; let us assume that such a process begins in the tenth stage of the series. Before that, say in the third stage compositions may be found only on two or three lines, such as $V_3v^3T_3t^3$ or still further $V_3v^3T_3t^3M_3m^3$, or $V_3v^3T_3t^3O_3o^3M_3m^3$. The V precedes in the formula indicating its primary importance in the case of the moment where the visual sensory elements are mainly the guide for sensori-motor reactions, the visual sensations constituting the leading and central elements of the compound. In a moment of the same type but with a differently related content O or A may be the main elements of the compound, an element round which other sense-elements become grouped. The formula may then be $O_3o^3T_3t^3M_3m^3$, or in the case where A is predominant $A_3a^3T_3t^3M_3m^3$, etc. The synthetic moment will from its starting point, say $V_{10}v^{10}T_{10}t^{10}$ $O_{10}o^{10}A_{10}a^{10}M_{10}m^{10}$ proceed onward, reaching its height of development and adaptation in the compound V^nv_n $T^nt_nO^no_nA^na_nM^nm_n$. This last stage of the moment has at its disposal the accumulations of all the previous synthetic moments both simple and compound. The compound synthetic moment is the heir of all previous acquisitions and accumulations, and, as such, may be characterized as the *compound, accumulative, synthetic moment.*

Although the simple synthetic moment and the compound moment differ in character and complexity of content, they still agree in one general trait characteristic of the synthetic moment, namely, *fixed* synthesis. The series of sensory elements, both primary and secondary, that enter into the content of the moment are firmly combined. The elements of such compounds cannot get disengaged and do not therefore exist in a free state, they form *stable* compounds.

The form of reproduction common to all the moments thus far examined is that of *reinstatement.* The sensori-motor elements of the moment are reinstated in all their reality. The moment in its successive stages of reproduction is brought to life by impressions coming from external stimuli. Primary and secondary sense-elements enter into the moment's constitution whenever it reappears. In both forms of the synthetic type, the moment with the recurrence of the reproductions, becomes enriched in sensory elements, primary and secondary; but these elements must be *present,* and, from the very nature of the types of moments under consideration, no other elements can possibly be present. The series in which the successive steps of the moment, desultory or synthetic, manifests itself is composed entirely of sensory elements, most or all of which vary but little from one beat of the moment to the other.

The fact of the simple reinstatement is especially clear in the case of the desultory moment. Each reinstated moment induced by external stimuli is an exact copy of its predecessor. In the synthetic moment the content of two adjoining stages is a little varied, still the sensory elements constituting the content of the preceding moment is reinstated in the succeeding one. It is true that even the desultory moment is not absolutely smooth in its course of repetitions or reinstatements. Interruptions of functions due to unfavorable stimuli often occur within the series, interruptions which may be brought about by artificial conditions and in which different psycho-motor responses are interpolated, but these responses do not enter into the content of the moment when the favorable conditions are restored,—the responses do not become habitual. Thus the rhythmical pulsations of the vorticella may be temporarily arrested by the evaporation of the liquid in which it is contained, but no number of evaporations will change the series of rhythmical pulsations by having stages of arrests interpolated into the series. Similarly it is highly questionable whether a fly, beetle, or cockroach could contract any habits.

Some eminent psychologists go to the length of affirming that even the lowest representative animal life, the protozoa (possibly bacteria, bacilli), possess ideational and volitional processes, that the lower stages of mental life manifest association, reproduction, memory, cognition, and recognition. Other psychologists are more moderate, they regard the acquisition of knowledge as adaptation through habit, characteristic of the lowest representative of animal life. Thus one psychologist propounds the question, "How is it that we or the brute *learn* to do anything?" Does the amoeba *learn* at all? What belongs to our type of consciousness is assumed as being true of all types—the old psychological fallacy. "Learning," habits are biological variations characteristic of the higher types of consciousness and are not present in the lower forms of mental activity.

It is highly questionable whether the formation of habits is possible even in the highest representatives of the invertebrata, such as the bee and the ant. The ant is probably largely guided by the sense of smell, while the bee is prompted in its activity both by smell and sight. The activities of these animals, though highly complex, are still fixed in their character becoming manifested with the recurrence of definite sensory stimulations. The individual acquires nothing by experience and forms no habits; everything is formed by the species. Spontaneous variation and natural selection are the only agencies of the relatively high organization and complex psycho-motor life-activity of the higher types of the synthetic moment.

Habit is a character that does not belong to the desultory moment, it comes only with the birth of the synthetic moment. The fixed character of the desultory moment admitting of no modifications precludes the formation of any habits; the moment's reproduction therefore is reinstatement *par excellence,*—each reproduced moment being an exact copy of its original. The individual presents only the history of the species. The reproductions of the synthetic moment begin to show the history of the modification which have appeared in the course of the moment's life activity. Each recurrent reproduction of the synthetic moment is an epitome of its individual life-history, an epitome of its ontogenetic psychogenesis.

CHAPTER XVII

THE DESULTORY TYPE IN PATHOLOGICAL STATES

A FORM of reproduction analogous to t ones present in the desultory moment is be found in various psychopathologica states. The nature of reproductions of t hypnoidic states comes very near to the simple form reinstatement characteristic of the desultory momen The main feature of this pathological state is its recurrent sensory character isolated from the rest of th individual's psychic life. Experiences emerging this state are actually lived over again. The hypnoid state is desultory, it forms no connected relations in it various reproductions, it does not become modified b its many occurrences, and the first stage is as ric in psychic content as the last stage. The hypnoidic state is relatively fixed. Of course, between the desultory moment and the hypnoidic state there is onl an analogy in the nature of functioning, otherwise the states are actually different, inasmuch as they belong to altogether different types of moments.

The nature of reinstatement characteristic of the reproductions of the synthetic moment is clearly reveale in the way modifications are effected and non-adaptive reactions are eliminated. Sensory responses and motor reactions that have met with failure and evil consequences are modified by degrees, in portions so t say. The law that regulates the succession of the modifications effected is the order of the degree of harm consequent on the reactions to which the sensory responses lead. If then the most harmful reactions belong to the middle of the series of motor reactions constituting the motor aspect of the moment, these are modified by being gradually dropped out and others substituted. The rest, the more or less indifferent reactions of the series are gone through, although they bear no longer any relation to the sensori-motor reactions that have immediately preceded them. To an external observer such reactions are ridiculous and unintelligible, since they cannot be understood with reference to their immediate antecedents; their nature can only be made clear from the history of the moment.

Such traces in the organization of the synthetic moment are vestiges of previous useful functions, of a series of adaptive reactions; they are like rudimentary organs in the economy of the organism. Thus a chick may peck repeatedly at his waste products or at a burning match and repeatedly wipe his bill; finally a marked modification is brought about in its sensory responses and reactions. When the chick is confronted with those objects, it comes up to them, looks at them, does not peck, but wipes its bill. To an external observer to whom the history of the chick's experience is unknown, the wiping of the bill would have been entirely unintelligible.

Reinstatement can be similarly observed in cases where conditions have changed, but the modification has not yet been effected within the content of the moment. Thus the story of the actions of the hen that brought her brood of chicks to the river and urged them to swim would have appeared strange, possibly mysterious, if not for our knowledge of the hen's former experience with a brood of ducklings. The mode of reproduction of the synthetic moment is a series of successive phases of more and more modified reinstatements which can only become intelligible on following up more or less closely the history of the moment's development.

The forms of reinstatement characteristic of the synthetic and desultory moments are to be found in higher types of moments. When undergoing the process of dissolution, secondary dementia, the terminus of chronic insanity offers a wealth of facts at our disposal. The mental states of secondary dementia are like the ruins of great castles, like fossils of former growth of vegetation and animal life. The active living moments are disintegrated, decomposed and only some of the constituents are left to function. These constituents, remnants of former life-activity, are simply reinstated. One who has not known the history of the case will hardly comprehend the actions of the patient. Thus one dement may keep on covering himself with a blanket, or hiding himself into corners. He who is ignorant of the history of the case would regard the action as capricious and meaningless, he would hardly guess from the patient's actions that the latter when in a state of chronic melancholia labored under the delusion that he was made of glass, and that people could see the actions of his guts. The synthetized and systematized delusion itself was swept away in the general ruin and decomposition, only some remnants were left, a few sensori-motor elements remained. These elements are now being reinstated in the same fashion as the simple types of the synthetic and desultory moments. Similarly it would be hard to guess from the frequent mumbling of the words 'Alexander,' that the dement in his early stages of mental alienation was under the delusion that he was the deceased Russian czar come to life. The word 'Alexander' is simply a chip of a former highly systematized moment, the chip now reproducing itself after the simple fashion of the desultory moment.

The phenomena of imperative concepts, insistent or fixed ideas, uncontrollable impulses all grow and develop along the general lines of the synthetic moment. They are *reinstatements* of portions of dissociated moments buried in the subconscious and growing by the process of modification with each recurrent reinstatement.

Hypnoidal states described by me bear evidence to the same truth of reinstatement of psychic elements. In the hypnoidal states fractions of dissociated moments present in the subconscious come up like bubbles to the surface of the patient's consciousness, burst, disappear, and vanish never to come again. The fragments are reinstated chips of highly organized moments, now in a state of disaggregation. The hypnoidal chips sometimes manifest themselves in their reproduction after the mode of simple or elementary desultory consciousness, mental states appear and disappear, leaving no traces behind them.

In the phenomena of automatic writing, crystal gazing, shell-hearing and so on, reinstatement of moments in different degrees and stages of organization takes place. Finally in the phenomena of hypnosis we meet with similar conditions, the states are induced artificially in the otherwise healthy and normally functioning individuality. Such are the phenomena of personality metamorphosis and of post-hypnotic or hypnonergic states. In these states moments are artificially formed in the dissociated subconscious moments which rise to the surface of consciousness with all the energy supplied to them by the subconscious. They reproduce and perpetuate themselves after the mode of the synthetic moment until their end is achieved, when they gradually fade away, or, what is still more often the case, vanish in the same sudden and abrupt way as they come.

The artificially induced post-hypnotic or hypnonergic states studied from the standpoint of the moment-consciousness are found to be analogous to many psychopathic conditions. The main character of these states is their dissociation and reproduction, or rather reinstatement on the basis of lower types of moment-consciousness.

In psychopathic functional states not only does disintegration of content occur, but there is also present functional degradation of the type of the moment. The function of the moment reverts to lower types of psychic activity, while the content consists of constituents formed on higher lines of psychic life. Hence the lack of adaptation, the conflict in psychopathic states between function and content. It is like the formation of a barbaric society out of the remnants of a ruined civilization.

We may then affirm that the characteristic mode of reproduction, both of the desultory and synthetic moment, is *reinstatement*. The difference between the two moments being that while *the moment of the desultory type reproduces by reinstatement only, that of the synthetic type reproduces by both reinstatement and modification.*

CHAPTER XVIII

PRESENTATIONS AND REPRESENTATIONS

IN the course of our analysis of the lower types of moments it has been shown that the psychic elements entering into their synthetized content occur not in a free independent state, but in fixed accumulations and stable compounds, having reinstatement as the mode of their reproduction. There is, however, a higher type of moment in which psychic elements occur in a free independent state, having accordingly a mode of reproduction different from that of the types we have just examined. Let us see now what the nature of these free elements is, how they come to arise and what is the peculiar mode of their reproduction.

If we look at the tree yonder and then close our eyes, we can represent to ourselves the tree in its general outlines at least. We see its trunk, its branches, and its green foliage. After our friend's departure we continue to see him in our mind's eye. We live over mentally, in our imagination, all our relations, our mutual enjoyments. We seem to watch him act and hear him talk. The representative elements cannot possibly be identified with or derived from after-images. For after images are really *after-sensations* and consist of sensory elements. The elements involved in the state of representative psychic life are freed from all immediate coexistence with sensory elements, primary or secondary; in fact, they appear when the sensory elements disappear.

The two sets of psychic elements, the presentative and representative, stand in inverse relation to each other. When the one is at its *maximum* the other is at its *minimum*. When sensory elements appear the free elements become faint. This faintness is in proportion to the intensity of the sensory element. It is hard for us to look at a color and imagine it at the same time; and the more intense and brilliant the color is, the harder it is for us to have the color, at the same time, represented. Look at an object, say the lighted lamp, take in well its sensory elements and you will find that it is almost impossible to represent it to yourself at the same time. Try hard to *represent* to yourself the object and you will find that its sensory elements will begin to vacillate and become faint, or less vivid. When absorbed in our ideas we often do not notice even very intense stimuli. The two series of elements, the sensory or, presentative, and the free ones, the representative, cannot run together without interfering with each other, nay, without arresting each other.

Representative elements bring with them a new fundamental departure in the mental activity of the moment, they may keep up its activity when flagging, may intensify it, but may also deflect it, or distract it, giving rise to another conflicting moment. Thus on the one hand my continuous thought about a certain scientific proposition constituting the substance of the present active moment may begin to flag, but it is soon kept up by new observations and experiments; on the other hand, the occasional glance at the morning newspaper may tend to deflect mental activity to quite a different channel by awakening the activity of quite a different moment-consciousness conflicting with the train of thought on scientific matter.

Presentative elements have a permanency and stability which representative elements totally lack; they can be kept up in their full strength by keeping up the same intensity of stimulation, as by maintaining the object before the particular sense organ that forms the nucleus of the percept. Thus the pricking of the needle is perceived as long as the stimulation is continued, and the chair yonder is seen as long as it is kept before the eyes. Representative elements on the contrary, are extremely unstable and fluctuating, and are aptly characterized as being very much like "the flare and flicker of a gas flame blown by the wind." When representative elements become permanent, stable, the state of the moment acquires a pathological character manifested in the phenomena of insistent thoughts and fixed ideas.

Presentative psychic elements are always firmly bound up with an external object and with stimulations of peripheral sense-organs; they can never free themselves from the bondage to the external environment. Not so the representative elements, although appearing at first in connection with sensory elements and peripheral stimulations, they finally end by freeing themselves from this bondage. The representative elements involved in the representation zebra do not originally arise without some presentative elements. Once however, the given representation has definitely arisen we may imagine the zebra without actually perceiving it. In the midst of a conversation, or in the midst of an engaging study, the image of a tiger, or of a palm seen in some distant country may rise clearly and vividly before the mind's eye, and temporarily interrupt the course and trend of our thought.

While I am writing these lines a fleeing copperhead, a pulsating vorticella, a fish's tail, a cow's head and a puffing steam engine have flashed across my mental field and gone. They may be ultimately traced to some sensory stimulus and positive after images, but these are far in the background of consciousness and remain unnoticed. Representative elements come and go in consciousness, they appear independently of all other elements, they are essentially free elements. We call this coming and going of these independent elements the "free play of the imagination."

Where sensory elements appear in synthetized compounds, or in the precept, they cannot be separated, they are firmly bound together. It is only in representation that the corresponding representative elements free thmselves from the bonds of union which the sensory elements cannot throw off. The orange yonder is a synthetized compound of many sensory elements, primary and secondary, but as long as they remain sensory the elements are kept in union and cannot be dissociated. Such a dissociation, however, is fully possible with the representative elements entering into the representation of the orange. We can think of its color, size, shape, weight, smell and taste separately.

The freedom of the representative elements is clearly brought out in the so-called free play of the imagination. Sensory elements are synthetized in the compound in definite relations which cannot possibly be severed unless the stimuli are rearranged, and in many cases the sensory elements do not admit even of that procedure. The sensory elements in the perception of a particular object, say a house, have definite relations which cannot be modified without first changing the color, structure, shape, size, of the house and rearranging its relative parts. In imagination or representation, however, all that is done in less than no time, without in the least interfering with the external stimuli.

Representative elements manifest even more freedom. In many cases a modification of certain relations in the sensory elements cannot possibly be effected, because the relations of the external stimuli constituting what may be termed the external object do not admit of a rearrangement. Thus we cannot have the mouth of the horse on his back, horns growing out of his sides, the mane on his hind parts and the tail on his brow. We can, however, easily accomplish such a rearrangement in our imagination. Furthermore, in representation psychic elements appear in combinations of which sensory elements do not admit. Pegasus, a horse with wings; mermaid, a being half woman half fish; centaurus, a being half man and half horse, and other combinations of the most impossible character, as far as sensory elements are concerned, may be formed in representation.

At first representative elements are started by sensations and are thus far bound up with them, but they gradually free themselves from it. Thus in a baby under my close observation, the representative element never came unless the object was present. If the object was taken away, he soon forgot it. In the uneducated mind even of a high type of moment-consciousness representations are still bound up with presentations. The gossip can keep on talking as long as the thought is fixed on the concrete. Persons who lack scientific, conceptual thought cannot grasp an abstract general proposition without having it first expressed in concrete terms, or fixed in sensory pictures. The savage gets a headache when his thought is forced to flow in a stream of representation. In the imbecile, in the idiot we find the same thing manifested. They can only think in concrete sensory terms. In mental asthenia which approaches the state of the higher stages of imbecility and also in secondary dementia, states consequent on psychic degeneration, we find the same truth illustrated. The patient's mental activity falls many stages nearer to the level of presentative life. It is only in the higher forms of psychic life that representative elements become free, independent, and are freely and easily associated and dissociated.

If looked at from the standpoint of control, we find *that sensory elements,* on account of their fixed relations in the combinations and compounds in which they enter, *are uncontrollable.* The compound with all its sensory elements, primary and secondary, is given, and cannot directly be controlled; it is highly stable, it resists attempts at decomposition. The combinations, however, formed of the free representative elements are of unstable equilibrium, the elements can be easily shifted, displaced, rearranged, easily dissociated, and new combinations formed. The mode of function of the representative element is *free association.*

Even when entering into the associative play the representative elements do not blend and fuse so as not to be discriminated. Representative elements certainly do not float about without entering with others into some form of association, but in the very association and combination they still manage to preserve relatively their freedom and independence. The sensory elements in the compound are so blended and fused that they cannot be discriminated in the compound without some effort and under special artificial conditions. Oculo-motor sensations, the estimation of the visual angle, of the size of the image thrown on the retina are not so very evident in the direct perception of the external object. Tactual and muscular sensations are not so very clear in our perception of space, nor are our rhythmical, respiratory and kinaesthetic sensations quite obvious in our estimation of time. The free associations, however, into which representative elements enter give full scope to their components. The elements are combined without at the same time losing their individuality; they remain clearly defined in their nature and outlines in relation to the other elements with which they form combinations.

Representations, however, presuppose presentative life, they constitute the intermediate stages of which presentations form the termini. *Representations begin and end with presentations.* At the same time it should be clearly held in mind that while representation refers to presentation, it is by no means true that representations can be analyzed into sensory elements in the same way as a living organism can be analyzed into elementary cells. The living organism is made up, is constituted by elementary cells; cells form the organism. Representations, however, are not formed out of presentative elements, sensory elements, sensation elements. Sensory processes do not enter into the make-up of a representation. Just as the sensation black is not black, so is the idea or representation of black not a sensation 'black.'

CHAPTER XIX

REPRESENTATIONS AND THE LAWS OF THEIR COMBINATIONS

REPRESENTATIVE elements form what may be characterized as mental trains. The elements of a mental train are connected by relations of contiguity, resemblance, and contrast. Association by contiguity depends on the frequency, recency with which the elements have been associated, while resemblance and contrast may be regarded as two or more mental trains of representative elements associated by contiguity, crossing and intersecting in a few points, in other words having some element in common. From this standpoint associations by resemblance and contrast are often regarded as cases of contiguity which is therefore considered as the mode of association characteristic of representative elements. From another standpoint, however, resemblance may equally be considered as fundamental. It is nearer to the truth to regard both contiguity and resemblance or similarity as fundamental modes of association of representative elements.

Association by contiguity may be expressed in the following general proposition: Ideas or images which have frequently followed one another tend to recur in the same order. If *a, b, c, d, e* be images or ideas that have frequently followed each other in a definite order of succession, then the tendency is that the ideas or images will occur in the same order, if the initial idea or image is awakened. Thus if *a, b, c, d, e,* be that order, then if *a* is awaken the rest, *b, c, d, e,* tend to eme in the same order in which they have followed each o er previously.

The formula for association by contiguity may expressed as follows: $a+b+c+d+e+\dots$

Representative elements, however, as we have poin out are derivative, they are functions of sensory co pounds, and vary concomitantly with the wealth and d ferentiation of sensory life-experience. Blind peo have no visual images, nor can deaf persons form a idea of a sound. Although representative elements a essentially different in nature from sensory elements an their compounds, still it remains true that sensory e perience is the soil from which the rich variety of rep resentative life grows up. Sensory elements and the compounds are prerequisites of representations of the combination and organization.

The course of associative relations of representatio may be determined by the course of sensory series. I a series of sensations and perceptions have frequent followed each other pretty uniformly, then their co responding representations will tend to recur in the same uniform order. Let A, B, C, D, E.... be the order of succession of the sensory series, then the ord of the series of representations will be: *a, b, c, d, e*.... When sensation A with its corresponding representatio *a* are awakened, or if *a* alone occurs, then the rest of th series of representations tend to emerge. The formul for association of contiguity may be somewhat modifi and represented as follows:

$$\begin{array}{cccccl} a & b & c & d & e & \dots\ \text{Representations} \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \\ A & B & C & D & E & \dots\ \text{Presentations} \end{array}$$

$A+a+(b+c+d+e)$, or simply $a+(b+c+d+e)$....
$B+b+(c+d+e)$, or simply $b+(c+d+e)$....

We have shown that ideas and images are associated with motor and physical reactions, hence muscular movements or rather kinaesthetic sensations and their representations also enter the circle of the associative series. The series of representations gives rise to movements which in their turn give rise to kinaesthetic sensations, and these in turn may either give rise to another series of representations, or may maintain the same series. Hartley, the father of English associationism, who reduced all association to contiguity, states his doctrine of association in the following general proposition:

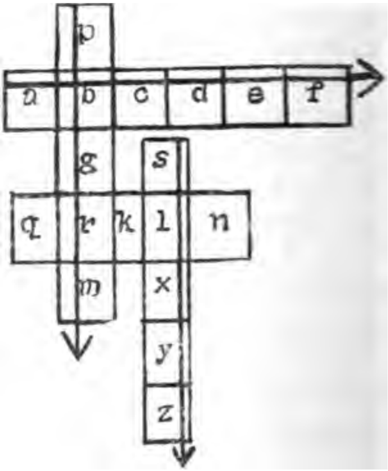
"If any sensation A, idea B or muscular motion C, be associated for a sufficient number of times with any other sensation D, idea E, or muscular motion F, it will at last excite *d*, the simple idea belonging to the sensation D, the very idea E or the very muscular motion F."

Turning now to association by similarity we find that the relations of the elements are somewhat more complex than in that of contiguity. Where mental life is complex and where there are present many different trains of ideas and images, there will be a tendency for them to cross and intersect at many points. The course of a given train of ideas and images instead of running in its habitual line will tend to become deflected along other lines and give rise to that particular form of association of representative elements known as association by similarity and contrasts.

Let a, b, c, d, e, f, be one series and let p, b, g, r, m, another series, q, r, k, l, n, a third series and s, l, x, y, z a fourth series and so on. The course of association instead of running along one line of habitual association determined by contiguity will tend to run on new lines. The course may be represented as follows:

a,—b,—c,—d,—e,—f
↓
p,—b,—g,—r,—m
↓
q,—r,—k,—l,—n
↓
s,—l,—x,—y,—z

Let each series be represented by a row of squares formed into a rectangle and let each crossing series be representd by a similar rectangle intersecting the preceding one at right angles, then the course of association by similarity may be diagrammatically represented as follows:



The course of the mental train of ideas is changed and deflected along lines which are otherwise unhabitual for the particular mental train. In association by similarity the mental train ever corruscates along new lines.

Association by similarity may be expressed in the general proposition: *like states often follow each other.* What that likeness consists in we have already seen,—it is some common characters, some representative elements which two or more crossing trains of contiguous representations possess in common. The crossing of one train by another at a point where the representations have common features is purely accidental, as far as the crossed train is concerned; it is the play of the imagination. As an illustration of such a crossing of trains we may take the example when one, from a series of images and ideas about the recent Americo-Spanish war, is led to think of the Anglo-Spanish war in the 16th Century, the common representation being the destruction of the Spanish fleet; and from the mental train on the Anglo-Spanish war to the Franco-Prussian war the common representation being invasion, and from this to the Napoleonic war, then to the political affairs of France, and thence, to the peace conference of European powers. The course of the trains of ideas is every time deflected along new channels. The deflection depends largely on the complexity and number of the trains and their activity.

The relation of likeness is present not only in trains of representations, but also in presentations or in what is termed by us psychic compounds. Thus twins we say look alike, so do eggs, so do animals of the same species; a picture say of a landscape looks like the actual landscape, and a portrait or statue resembles the original. In all these examples the likeness is constituted by the sensory elements common to the presented psychic compound. Not that the sensory elements are exactly the same; subjectively considered, they may be totally different in their psychic stuff, in the psychic relations that cluster about them, as no two sensations, no two psychic compounds, are really the same, as far as the mental state is concerned, but *they refer to the same characters in the external object.* It is this common reference to the same traits or characters in the external object that constitutes the bond of association of likeness in sensory element or psychic compound. On the same grounds may be explained the likeness between the representations and the psychic compound, the percept which it represents.

CHAPTER XX

REPRESENTATION AND RECOGNITION

IF from the general consideration on the modes of combinations or free association characteristic of representations, we turn to analyse the nature of the moment with representative elements as content, we find that it differs essentially from the synthetic and desultory moments. A close inspection of the character of representations reveals the fact of its difference from presentation-elements. A representative element is neither of the nature of the primary nor of the secondary sensory elements, it differs from both in the character of its psychic "stuff." The difference consists in the fact that a representative element is *not cognitive, but recognitive.*

As far as the cognitive aspect is concerned the chief characteristic of the synthetic and desultory moments, having sensory elements only as their content, is the *direct* reference to the object, to the relations of the external environment, while the characteristic feature of the moment, having mainly representative elements as its constituent, is the *indirect* reference to external relations. In other words, the sensory elements of the synthetic and desultory moments have *immediate* cognition, while the representative elements of the moment now under consideration has *mediate* cognition, or *recognition.* I see the book lying on my table, I close my eyes and represent to myself the whole thing over again. As I look out of the window

I see a house, a horse and carriage standing near by; I close my eyes and imagine the whole situation over again. We say then, incorrectly though, that the representation is a copy of the presentation. Evidently the representation is regarded as not being the same as the presentation just as a copy is really not the same as the original. The psychic elements of representation have the function of cognizing again, or what is more correct to say the function of *re-cognition* which constitutes the very essence of representation. In representation events are lived over again without the actual recurrence of those experiences. In representation the moment becomes independent of the present, it becomes free from its immediate environment.

In order that a representation be a true "copy" of its original, it must be cognized as a "copy," that is, it must be cognized as something already cognized, in other words, it must be *recognized*. This function of recognition is the *sine qua non* of representation. The image, representation, or idea of a table is not itself a table, nor is it a synthetized sensory compound referring to the object, table, it is a psychic element referring to the sensory compound on its objective aspect. The representation of the table does not refer directly to the table as it is the case in the sensory compound, but to the table as *perceived*. The image or representation refers not to the object immediately, but mediately, to the object as object of the sensory compound. Hence the object is cognized over in representation, in other words, is *re*cognized.

This recognition may be of a general or of a specific character. The function of recognition in its general aspect is manifested in the idea. The idea possesses this function of general recognition. The idea "man" recognizes its content in a general way, it refers to man in general, but does not identify its content with any particular individual. I may represent to myself an object recognized as a table, not as any particular table, and I may also represent this particular table on which I am writing. The representation I have of my friend John refers specifically to John not to any one else. As in my imagination I scrutinize the features of my friend's face, I all along recognize that it is my friend's countenance. Recognition, general as well as particular, is involved in the very function of representation.

In immediate perception itself there is no recognition present. It is not true to fact to say that in the perception of a horse we recognize the object by perceiving it as horse and not as anything else. The fact that I perceive the object as it is depends entirely on the sensory compound which has cognition as the function of its psychic character. The sensory component, the percept horse, is the cognition of the object "horse."

Some psychologists attempt to find the origin of recognition in the feeling of familiarity. Familiarity, however, is not a primary state out of which recognition develops, but on the contrary recognition is the primary state and familiarity is derivative only. Familiarity is simply the feeling of vague, marginal, or subconscious recognition. Of course, if by the term familiarity is meant not that psychic state observed in the adult consciousness, both abnormal and normal, but that primary state of recognition out of which more definite recognition develops, then it may be admitted that familiarity is the germ of recognition, but then it is only the giving of a special term "familiarity" to an elementary form of recognition. The definite form of recognition develops out of the indefinite form of recognition, recognition must be a primary element. Recognition then is an irreducible mode of psychic activity characteristic of representative mental life.

Some psychologists regard familiarity as a pure 'feeling of at homeness' or as Fouillée puts it in the decrease of the inward shock of surprise. This is however to put the cart before the horse. It is not the feeling of familiarity that gives rise to recognition, but it is vague, indistinct, marginal, or subconscious recognition that gives rise to the feeling of familiarity. When a person, a scene, an event, or situation is familiar, the psychic state is one of having gone through the same experience before. We cannot localize its date in our scheme of time on which we project our past experiences. We have experienced the same before, but we ask ourselves,—where and when have we seen that person, the scene or the situation before? Often we succeed in forming a complete association with the past, we localize the given familiar experience, and then complete recognition ensues. *Familiarity is incomplete, vague, indefinite recognition.*

The peculiar experience of a present novel situation as having experienced or lived through the same before has been mystically referred to a previous existence, the theory of Platonic reminiscence. The explanation, however, of this phenomenon is quite simple, inasmuch that it can be shown that in such cases some similar experience had been gone through before. The subject cannot close the circuit, so to say, and effect a connection with his previous life experiences, he cannot associate fully the present experience with his former experience and localize it in his past. Other cases of such familiarity are brought about by states of dissociation. The patient perceives, goes through experiences in one state and vaguely remembers them in another. Such states of familiarity or imperfect recognition can be found in pre-epileptic states, in post-hypnotic conditions, in hypnoidal twilight states, and other subconscious dissociative states.

In regard to this phenomenon of general familiarity almost amounting to recognition without attaining it James makes the following pertinent remarks which fully bears out the fact that recognition is primary and is at the basis of what we term the sense of familiarity. "There is a curious experience" says James "which everyone seems to have had—the feeling that the present moment in its completeness has been experienced before—we were saying just the thing, in just this place, to just these people, etc. This 'sense of pre-existence' has been treated as a great mystery and occasioned much speculation.....I must confess that the quality of mystery seems to me a little strained. I have over and over again in my own case succeeded in resolving the phenomenon into a case of memory, so indistinct that while some past circumstances are presented again, the others are not. The dissimilar portions of the past do not arise completely enough for the date to be identified. All we get is the present scene with a general suggestion of pastness about it." I may say the same thing in my own case. Whenever I find in myself the presence of some obscure form of familiarity, I can invariably trace it to some vague, indistinct memory of an experience lived through some time before. The same holds true in the case of patients, as well as of my experiments carried out on subjects in subconscious states, hypnotic, post-hypnotic, hypnoidal, and others.

When an experience enters into a number of systems, or as James would put it into a number of "settings," then the special character of the "setting" becomes confused or even obliterated. The experience present calls forth so many different systems or "settings" that the recognition element lapses and reverts to the psychic state characteristic of the lower forms of moment consciousness, passing through the more elementary forms of recognition to cognition. When the recognitive moment reproduces itself so that it becomes habitual and automatic, it falls in the scale of psychic life and reverts to the type of a lower moment.

A psychic state which recurs under a great number of conditions and circumstances loses all special and local psychic color, so to say, and hence becomes degraded in the type of its mental activity. All ordinary experiences which have been recognized over and over again, all sorts and conditions of mental life, under different and opposite tendencies, feelings and emotions, under various settings and conflicting systems cease to be surrounded by a nimbus of pastness and become cognitive in character. When too often repeated the experience becomes so much worn by use, if we may use such an expression, that it can no longer be reproduced voluntarily in consciousness. Thus a strange face seen a few times or only once can be clearly represented, but the faces of familiar people with whom we are in constant intercourse can no longer be clearly reproduced and represented. Such a reproduction can only be brought about by a perceptual state, or by various subconscious states, such as dreams, hypnosis, or hypnoidal state. In such cases there is present a feeling of familiarity due to the series of recognitions and cognitions. Familiarity here is lapsed recognition.

James brings it out clearly: "If a phenomenon is met with, however, too often, and with too great a variety of contexts, although its image is retained and reproduced with correspondingly great facility, it fails to come up with any one particular setting and the projection of it backwards to a particular past date consequently does not come about. We recognize but do not remember it—its associates form too confused a cloud." In other words, recognition does not reach its full development. There is recognition of the phenomenon as such, but not as having had the experience in the past. The halo of pastness is gone. James quotes Spencer "To ask a man whether he remembers that the sun shines, that fire burns, that iron is hard, would be a misuse of language. Even the almost fortuitous connections among our experiences cease to be classed as memories, when they have become thoroughly familiar. Though on hearing the voice of some unseen person slightly known to us, we say we recollect to whom the voice belongs, we do not use the same expression respecting the voices of those with whom we live. The meanings of words which in childhood have to be consciously recalled seem in adult life to be immediately present.

"James then goes on saying": "These are the cases where too many paths, leading to too diverse associates, block each other's way, and all that the mind gets along with its object is a fringe of felt familiarity or sense that there *are* associates. A similar result comes about when a definite setting is only nascently aroused.

We then feel that we have seen the object already, but when or where we cannot say, though we may seem to ourselves to be on the brink of saying it. That nascent cerebral excitation can affect consciousness with a sort of sense of the imminence of that which stronger excitations would make us definitely feel, is obvious from what happens when we seek to remember a name. It tingles, it trembles on the verge, but does not come. Just such a tingling and trembling of unrecovered associates is the penumbra of recognition that may surround any experience and make it seem familiar, though we know not why." In other words, imperfect, diffused recognition with no special system, or setting to come in live contact with and be localized in a mental series of an individual moment consciousness fails to give that mental synthesis which is the essential characteristic of the fully developed moment-consciousness. Recognition of an experience lived through in the past is the basis of what is known as the sense of familiarity.

Perhaps we may refer to the Bergsonian view of recognition, namely that recognition is interrelated with and based on special motor adaptations. "Every perception" says Bergson "has its organized motor accompaniment, the ordinary feeling of recognition has its roots in the consciousness of this organization." While it is true that recognition deals with the use of objects and with special adaptations to the external environment, as far as such recognition is expressed in motor adjustments, it can hardly be said that this view holds true of recognition in general. In the process of recognition it is not the motor accompaniment, it is the feeling of sameness of experience, the feeling of pastness with its localization in a series of "settings" or of systems that go to form the main elements.

I must say that the motor accompaniments have been too much overworked in our psychological theories. We have carried over into our philosophy, such as pragmatism, and into our psychology of recent years too much of the haste and whirl of the exchange and the shop. Everything is motor and everything is practical. This is a reflection of our present industrial age in the domain of the mind. Perhaps it expresses well the tendency of the modern philosophical and psychological trend of transmuting every thing into motion when psychologists describe themselves as being "motor men on the psychological car."

Recognition is not motion at least from a psychological standpoint, unless like Bergson we resort to the metaphysical, pan-psychistic argument of reducing motion to independent objective images as constituting the nature of external reality. Barring such metaphysical speculations that, as we have pointed out, have no place in psychology which must keep strictly to the difference between the external and internal, to the opposition of the objective reality of the material world and of the subjective reality of the mental world, different spheres of phenomena which should not be reduced one to the other, we cannot help realizing the fact that there is far more of the character of recognition in mental states in which the motor element is insignificant or *nil,* such as sensations, ideas, memories, thought reasoning and so on than there is in the automatic reflex reactions of behavior and motor adjustments. When we see color green and recognize that we have seen it the day before we can hardly speak of a motor element present in recognition. When I think of the Bergsonian theory of memory, or recognition and remember of my thinking about it the night before and disagreeing with it, the motor element can only enter by a great strain of imagination. If there are any motor elements they hardly play any significant part in the process of memory and recognition. We must deny emphatically the significance and importance of the motor element in recognition. The essential element in recognition is not the motor, but the psychic elements.

Bergson himself is driven to take this aspect of recognition when he develops his theory of pure memory with no action in contradistinction to the memory which inserts itself edgewise into the flux of sensori-motor adaptations. Bergson not without some contradiction strongly contrasts the true pure memory with the memory image sharply inserted into the plane of action. If we grant Bergson that such pure unadulterated memories are present, memories free from all motor reactions, then we must necessarily agree to the fact that remembrance, recollection, and hence recognition can exist without any motor accompaniments. In other words, recognition cannot be resolved into action, into motor accompaniments, into behavior and reactions. Recognition is a psychic *quale sui generis.*

Each set of particular representative elements carries along, as James terms it, its special "setting" or as I describe it "system." It is this special setting that helps the process of recognition in having the particular experience projected in the past, in having it oriented among many other systems of associations and having it localized in its particular past. Recognition then arises when the present experience calls forth its special system, or setting in a series of mental events. The present experience must close with the past experience and form a circuit. At the same time the experience must not be short-circuited, because in such a case we have a state of dissociation. The present experience must form a circuit with its system or setting and with the personality as a whole. Recognition thus requires a special setting in the complex web and woof of the present total moment consciousness constituting the individuality of the subject.

In the higher forms of mental life *where self-consciousness is developed, the experience forms a live circuit, so to say, with the whole personality.* The higher states of recognition appear in the form of the "I" consciousness. "It is I who experienced all that in my past. It is I who remembers that this bit of experience has taken place in 'my' experience some time ago." There *is the my present self thinking of the experience as lived through by my past self.*

In the lower forms of recognition where the self is not present, as in the higher vertebrates and possibly in infants, there exists the present cognition of the experience and the re-cognition of it in the shape of a vague memory that it had been experienced before. The present experience of an already experienced event floats in a cloud of pastness. It is this psychic state of pastness in a present experience that makes it felt to the subject who experiences it—as recurrent and recognitive. Of course, not every recurrent experience, even of the higher types of moments is recognitive, as there are psychopathic recurrent states which, like the lower forms of moment-consciousness, recur and reproduce themselves with no element of recognition present. *We can, however, fully assert that every recognitive experience is recurrent.* Recognition requires former or past experience.

CHAPTER XXI

THE RECOGNITIVE MOMENT AND ITS REPRODUCTION

RECOGNITION is one of the essential attributes of representative life. The faintest and most obscure representation requires the presence of recognition in the background. We may say that without recognition representation becomes an impossibility. Recognition is the function of representative elements. Just as cognition is the function of sensory, presentative elements so recognition, or *secondary cognition* is the function of representative elements. Now that moment consciousness which has representative elements among the constituents of its content may be termed *recognitive moment-consciousness.*

The recognitive moment is of a higher type than the synthetic moment. Like the synthetic moment, material or psychic content of the recognitive moment is assimilated in a synthetized form; like the synthetic moment, it goes on reproducing not on the desultory, but on the accumulative type; and moreover, it approaches more the compound, accumulative type. Unlike the synthetic moment, the recognitive moment is possessed of representative elements having recognition as their function. Representative elements with their function of recognition, present in the recognitive moment, but absent in the other lower moments, make a fundamental difference in the nature of reproduction.

The reproduction of the recognitive moment is totally different in character from that of the desultory and synthetic moments. In the desultory and synthetic moments reproduction is effected by means of presentative elements, and actual recurrence of former experience is indispensable; in the recognitive moment nothing of the kind is required. The reproduction of the recognitive moment is effected only in *representation*. The moment with its sensory elements is not reproduced as recurrence, but only *symbolized*, or truer to say *substituted* in meaning or in function by the representative elements. The representative element, the image, the idea is recognized as functioning as a substitute, as standing for the presence of the actual experience of the original moment with its nuclear primary and secondary sensory elements. In the higher stages of the moment this recognition may become detached, and the act of recognition may become duplicated and emphasized in another subsequent representation. In reality, however, both in the lower and higher forms of the recognitive moment, the fact of recognition belongs directly to the representation itself; for as we have pointed out recognition is an essential function of representation.

Just as sensory elements express, or present the qualities of the external object, so do representative elements mirror the psychic objects as presented to sense-experience. This relation may be expressed in a proportional form: *as presentation is to the external object so is representation to the presented object.* In the higher forms of the recognitive moment the representation can be once more represented and this latter is represented in its turn, each subsequent reproduction representing, substituting and mirroring the preceding one. Thus I may see the child yonder playing with its ball, I may represent to myself the whole scene, and may further represent to myself the fact of representation itself which in its turn may be once more represented, and so on. The content of the recognitive moment in this mode of reproduction, becomes more and more modified, more and more different as it proceeds along this line, becomes further and further removed from the original experienced moment with its sensory elements.

In the more prevalent forms of the recognitive moment the process of reproduction does not proceed in this way; reproduction keeps nearer to the lower types, to the content of the types of the synthetic moments, or, in other words, it keeps nearer to sense-experience. The representation has a direct reference to the object as presented in sense-experience, and in its reproduction this direct reference is more or less preserved throughout.

The recognitive moment is every time reproduced in representation, and although having different representative elements with each successive reproduction, it still refers to the same object as presented. The modifications that occur in the moment take place only in the representative elements. Adaptations, instead of taking place by means of changes in the sensory elements due to successive modification effected by the direct influence of stimuli from external environment, are now freed from the direct influence of external conditions, and may be effected within the representative elements of the moment itself, without having recourse to the modifying influence of stimuli.

We have already shown that the characteristic trait of representative elements is their freedom from the bondage in accumulations or compounds in which sensory elements are kept; representative elements can be easily transposed, they can enter into new free associations without requiring special external stimuli to break the stable compound. The free associations of representative elements may be dissolved by other representations. The stick lying near by may be kicked away by my foot, but may also be represented as a support; it may be imaged as a means of defense and attack, and finally the representation may be changed in another direction, the stick may be used as an instrument for bringing down apples from a tree. Adaptation is effected within the process of representation before any changes are introduced into actual, presentative life.

From a teleological standpoint one can realize the great gain in the economy of life reactions by a mode of reproduction independent of and free from the direct influence of external stimuli with their consequent sensory responses and motor reactions, resulting in further and further modifications of the original moment. The recognitive moment in its growth and development by a series of internal representative modifications spares itself ill adapted sensory responses and motor reactions. This is an immense gain to life, a great aid and powerful weapon in the struggle for existence.

Regarded from this standpoint of modification the moment-consciousness may be said to pass through important stages in the course of its development. *The stage of non-modifiability of content, then the stage of modifiability of the sensori-motor content, and finally modifiability in representation.* The special importance of the recognitive moment for the being possessing it is the greater freedom from the dominion of the external environment. External conditions are not so literally, so slavishly reflected in the moment. Changes may occur in sensori-motor reactions and adaptations due to representations alone, without any previous material changes in the external conditions. The recognitive moment carries its external world in itself, in its representation, and by affecting changes there, may bring about changes in the environment, thus controlling external conditions, instead of being controlled by them. Instead of being driven by external forces into blind obedience, into unintelligent adaptations, the moment is on the point, even in its lowest forms, to acquire some intelligent character in seeing ahead, by living over its former experiences in the states of representation, the sensori-motor reactions being accordingly modified.

The reproduction of the recognitive moment is not induced by external stimuli only, but mainly by the course of other representations. Without actually being confronted with the object the representation of it may any time arise in the mind and call forth new adaptations to the external environment.

The representation by which the recognitive moment effects its reproduction is not at all a mode of reinstatement, partial or complete, a mode characteristic of the lower types of moments. What the moment reproduces is altogether different in nature and content from what has been experienced, or directly presented. What is presented is sensory material, what is reproduced is imagery, ideal "stuff." Imagery, ideal stuff as it is, it still mirrors, substitutes, represents the "material" certainty of sensory experience.

From the very nature of the moment and mode of its reproduction the original emotional tone of the experience is not reproduced by the recognitive moment. The emotional tone like the rest of the psychic content is represented in recognitive reproduction, but not *actually* reproduced. The great gain of it from a biological standpoint is momentous, since the moment's reaction can be better adapted to the changing conditions of its environment. The representative elements entering into the idea or image of an object change from reproduction to reproduction but they always mirror, refer to the same sensory elements and compounds; they recognize their object.

The recognition of an object or an event, however vague, means some experience that has been lived through before. In other words, the representation, although experienced, as a present psychic element, must have a glow of pastness about it. *Representation is a present experience referring to a past life,* to an event that is passing or that has passed away. Representation with its function of recognition is a reference to the past.

This reference to the past may range from the indefinite to the highly definite localization of experience referred to the time past. This depends on the development of the moment, of its place in the scale of evolution. The higher the moment the more definite, the lower the less definite the localization is. The dog in recognizing his master, Ulysses, hardly knew the length of time the hero had been away in his battles and wanderings, although the dog possibly had a dim feeling of pastness, revealing it by the great joy manifested at seeing his master, as if his long delayed expectations have been finally fulfilled. If dogs are capable of recognition at all, some vague feeling of pastness is present in the recognitive moment, however low it may stand in the scale of development.

In the child we find that the time localization is quite indefinite. In very young children the future and the past such as yesterday and to-morrow have no definite meaning. Thus in children of three years that have come under my observation the apprehension of the past and future, such as yesterday and to-morrow is still wanting. When the child is told that something took place, he referred it to a "yesterday" indefinitely localized in the past. The day before, a week ago, a month ago, years past are equally projected into the vague past. The same holds true of the child-sense of the future. "When is to-morrow?" is a question I have been often asked by intelligent children of three, four and even five years old. The child recognizes his old friend after a departure of several months, but he localizes this event far off in time, say "yesterday."

The reference to the past becomes more and more definitely localized in time, the higher the recognitive moment rises in the scale of evolution. This process of localization of the recognized event in the past depends entirely on the time-sense becoming fully definite with the more or less greater perfection of the conceptual time scheme. Thus savages and the ignorant classes of even civilized societies have an imperfect form of time localization. The definiteness of localization, however, is not of material consequence as far as our point of view is concerned. For all we know Ulysses' dog, the ape and the infant have no time-localization at all, what is enough to state from our psychological standpoint is the fact that recognition involves some form of pastness belonging to the implicated representative element, a pastness which in a higher stage becomes time-localization.

Under the influence of toxic matter, of narcotics, and in some forms of mental diseases, this time-sense may swell, thus giving rise to the projection of experience on a larger scale of objective time. Such states are to be found under the influence of opium or cannabis, also in some mental diseases when the patient claims that he is many centuries old. This function of recognition with its aspect of pastness is certainly present in the passing recognitive moment. The process becomes more complicated and also more objectified in the higher types of moment-consciousness. In short, the recognitive moment-consciousness in addition to its reproduction involves some form of awareness of its being a reproduction by its reference to a past experience. Being freed from its bondage to the present circumstances, living in the by-gone past the recognitive moment gets a glimpse of the not yet born future into which the free representative elements are projected.

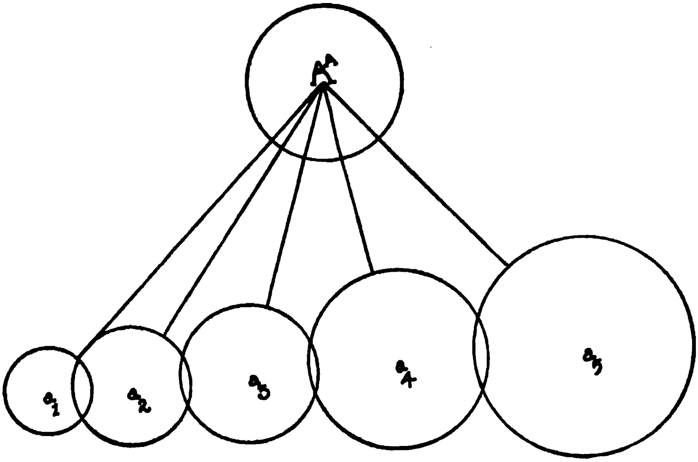
CHAPTER XXII

THE SYNTHETIC RECOGNITIVE MOMENT

THE recognitive moment in its reproductions may be arranged in a series. The first link in the series is the sensory elements or compound. Let this be expressed by A where A is the sensory experience, and let a be the representation of the first reproduction, the next reproduction may be represented by a_1 and the succeeding series by a_2, a_3, a_4, a_5, a_6, ... Each one of the series refers directly to state A with its external object. Each of them recognizes in the reproduced representation the represented, formerly perceived object of the primary state A. Each link in the series makes easier the occurrence of the succeeding one. The series forms a progression in which the link further removed from the beginning differs to a certain degree from the ones that preceded it. This progressive difference is due to the continuous progressive modifications effected in each successive link by the occurrence or reproduction of the preceding links. The process is one and continuous, and with the progress of the series of reproductions each following link becomes modified, emerges with greater ease, while the recognition is effected without any difficulty. Each previous recognition makes the next one easier.

In the character of its modification the lower form of the recognitive moment does not differ from the moment of the synthetic type of consciousness. Like the synthetic moment, the modifications are not effected consciously in the moment. The modifications are cumulative, without there being direct awareness of them. As to awareness of the previous reproduction and recognition each moment may be considered as isolated and separated. The history of the recurrences, of the reproduction and recognition is not given in the consciousness of the recognitive moment. As in the synthetic moment, an external observer is required who should read off the history of the recognitive moment from the final forms taken by psycho-physiological and sensorimotor reactions.

Expressed in a formula it may be said that each representation, each reproduction of the recognitive moment, refers to the object A of the sensory state A which may be represented as A^A. Symbolically represented the relations of the successive reproduced representations to the object as presented in state A and to each other in order of their succession may be expressed by the following diagram:



In other words the representative states in the series of reproduction all refer to the original experience A, and each preceding state modifies the succeeding one but the succeeding state does not include consciously the previous reproduction and recognition. The partial intersecting of the circles indicates that the successive states do not include their predecessors, but are only influenced and modified by them. The state, however, gets enlarged the further situated it is in the progression of the series. Each state inherits only the modifications accumulated by the preceding ones, but it does not inherit the cognition or recognition of the state itself.

In this respect the series of states going to make up the recognitive moment differs from that of synthetic type. The synthetic moment reproduces by reinstatement with modifications accumulated in the course of the process of reproductions. The recognitive moment on the contrary does not reproduce by reinstatement of presentation, but by representation. The preceding state need not be actually repeated, and if such a reference is present it is *represented.*

Representation is effected by different psychic elements. The same or like elements need not be reproduced in the moment of the recognitive type. In the recognitive moment of the stage considered by us such a reinstatement is altogether absent. The states following each other are different. Moreover they are isolated, disconnected in the series. The links in the series refer to the same object as presented, but they do not refer to each other in the order of their progression, state a^2 does not refer to the state a^1 that preceded it, nor does a^3 refer to a^2, nor a^4 to a^3, and so on. The series of tates of the recognitive moment in the stage under conideration do, however, effect modifications in the order of their succession, a^1 modifies a^2, a^2 modifies a^3, a^3 modiies a^4, and so on each preceding state modifying the succeeding one.

The dog on seeing a person for the second or third time may recognize the friend of his master, but he does not remember that he has recognized him already on previous occasions. Similarly when the baby sees a strange person for the first time, it may become scared and begin to cry. Subsequent repetition of similar experiences may reduce or on the contrary may increase the fear element, but the baby learns to know and recognize his man and the psycho-physiological and psycho-motor reactions follow as soon as the "man" is caught sight of. Reproduction and recognition become easier, but it is questionable whether the baby, like the intelligent dog, in recognizing the person, is aware of having recognized the person on previous occasions. The dog and the child are aware of the person and recognize him, but they are not aware of the series of preceding recognitions. A form of moment-consciousness with a series of isolated reproductions and recognitions, but with accumulated modifications may be termed the *synthetic accumulative recognitive moment.*

CHAPTER XXIII

THE SYNTHETIC MOMENT OF SELF-CONSCIOUSNESS

IN the higher stages of the recognitive moment the states in the series are no longer isolated. Each succeeding state embraces or truer to say includes and represents the preceding one. The whole series is essentially an interconnected one. The states in the series not only refer to the original experience of the object as presented, but also to each other in the order of their succession. Let A be the original experience of which A is presentative and a is representative, then the state of the recognitive moment may be represented by a^A. State a refers to a^A, and the succeeding state a^1 refers not only to a^A, but also to a. The same holds true in the case of the other states,—a^2 refers to a^A and a^1 and not only to a^1 alone but also to a; a^3 refers once more to a^A and also to a^2, a^1, a, and so on; each succeeding state refers to the original experience and also to the preceding states of recognition. In other words, each state represents not only the original sensory experience, but also some though not all of the preceding series of representations. *There is, in short, awareness in the act of recognition.* The preceding state modifies the succeeding one, and this latter is fully aware of the former. This awareness is present during the very occurrence of each state in the series.

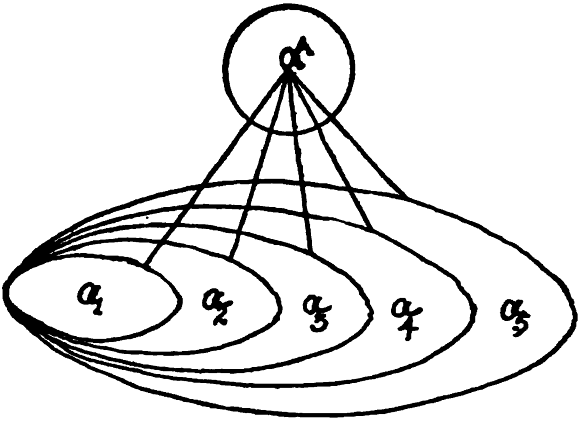
The reproduced state in its recognition recognizes the object as presented to sense-experience, recognizes, or is aware at least, that it has had some such recognitions on previous occasions, and at the same time recognizes, or is aware of its present recognition. Such a recognitive moment, the highest of all the moments-consciousness, is characteristic of the fully developed adult human consciousness or of self-consciousness and may be termed the *synthetic moment of self-consciousness.* The synethetic moment of self-consciousness forms a series of selves—the present or the percipient self, the past or the perceived self and the intermediate selves connecting the two selves as termini, the whole forming a series synthetized by the life of the synthetic moment of self-consciousness.

If we retain our previous denotation of objects and of the series of recognitive states and denote the recognitive reproduction by attaching the denotation of the presented object as index to the state then the state may be denoted by a^{A}, the succeeding states in the simple recognitive moment may be denoted by a^{A}, a_2^{A}, a_3^{A}, a_4^{A}, a_5^{A}, a_6^{A}. The states in the series of the synthetic moment of self-consciousness may then be represented by the following formula:

$$\begin{array}{cccc}
 & & & a^{A}, \\
 & & a^{A}, & a_1, \\
 & a^{A}, & a_1, & a_2, \\
a^{A}, & a_1, & a_2, & a_3,
\end{array}$$

and so on the last being extremely complicated...

Graphically the synthetic moment of self-consciousness may be represented as follows:



All along our analysis of reproduction we have at the same time by implication discussed the various types and forms of what may be conveniently termed as germinal memory in the states of consciousness of the lower animals. Memory, however, is not present in the lower types of moment-consciousness. Memory really begins with the recognitive moment and reaches its full perfection in the adult human consciousness,—in the synthetic moment of self-consciousness. It is only in the moment of self-consciousness that all the characteristics of memory are to be formed, namely, reproduction; not reinstatement, but reproduction after the kind of the recognitive moment, recognition, definite localization in the past and finally awareness of its own activity, or rather self-awareness. Memory germinates and grows in the recognitive moment, and blossoms in the personality-moment.

APPENDIX I

CONSCIOUSNESS

In opposition to the metaphysical view that there exists one consciousness and a separate content, James in his article "Does Consciousness exist?" flatly denies the existence of such a consciousness. He lays stress on the fact that such a consciousness is of a purely hypothetical and speculative character. Psychologically speaking all there exists is thought, experience, while an abstract undifferentiated consciousness may as well be omitted from the scheme of things. All we deal with is *mental facts*. James ridicules the position of those who regard consciousness as being independent of content: "To consciousness as such nothing can happen, for timeless in itself, it is only a witness of happenings in time, in which it plays no part" . . . "Consciousness as such is entirely impersonal—'self' and its activities belong to the content" . . . James' view is that instead of an impersonal consciousness we should substitute thought as a function of *knowing* (James's italics). "To deny plumply that 'consciousness' exists seems so absurd on the face of it—for undeniably 'thoughts' do exist—that I fear some readers will follow me no farther. Let me then immediately explain that I mean only to deny that the word stands for an entity, but to insist most emphatically that it does stand for a function. . . . That function is *knowing*" (James' italics).

We can thus far agree with James. When however he begins to speculate on unitary stuff and pure simple experience which is both objective and subjective we must part company, for he leaves the domain of psychology and enters the domain of metaphysics. "My thesis is" he writes "that, if we start with the supposition that there is only one primal stuff or material in the world, a stuff of which everything is composed, and if we call that stuff 'pure experience' then knowing can only be explained as a particular sort of relation towards one another into which portions of pure experience may enter." In this respect James approaches perilously close to Wundtian Voluntarism which he does not favor. It practically means double barrelled experience which on the one hand is objective while on the other it is subjective. As James puts it, the same experience is counted twice over in one stream which is external and the other which is internal.

All objections urged against Voluntarism may be brought against this view which is really nothing but the voluntarism of Wundt under a different garb. We are not better off by the assumption of the same experience participating in two different streams. We do not understand the streams any better by assuming differences which really amount to the differences of matter and mind, or of matter and consciousness.

James on the one hand is too metaphysical and on the other hand he wishes to eliminate the inactive, impassive consciousness of the idealists and of the Neo-Kantians. He is metaphysical in assuming a pure experience which is both material and mental and which in its purity is neither mental nor material. His true psychological sense tells him that an inactive, passive consciousness is a useless, futile assumption. James draws a sharp difference between internal and external experience. "We find that there are some fires that will always burn sticks and always warm our bodies, and that there—are some waters that will always put out fires . . . Mental fire is what won't burn real sticks; mental water is what won't necessarily (though of course it may) put out even a mental fire. Mental knives may be sharp, but they won't cut real wood . . ." In short, James himself strongly contrasts the two sets of experiences. That is all that the psychologist requires. The rest of the speculation,—the identification of the two streams in one unitary, primitive stuff-experience does not belong to psychology as a science.

The whole view of James is metaphysical, and still with his clear psychological insight he cannot keep away from psychological facts. He shifts from metaphysics to psychology: "The stream of thinking" he says, "(which I recognize emphatically as a phenomenon) is only a careless name for what, when scrutinized, reveals itself as to consist chiefly of the stream of my breathing. The 'I think' which Kant said must be able to accompany all my objects, is the breath 'I breathe' which actually does accompany them. There are other internal facts besides breathing (intercephalic muscular adjustments . . .) and these increase the assets of 'consciousness' so far as the latter is subject to immediate perception; but breath which was ever the original 'spirit', breath moving outwards, between the glottis and the nostrils, is, I am persuaded, the essence out of which philosophers have construed the entity known to them as consciousness. *That entity is fictitious while thoughts in the concrete are fully real. But thoughts in the concrete are made of the same stuff as things are.*" (James' italics). In this passage James as usual displays his great psychological introspection which is unfortunately complicated with metaphysical considerations.

Of course, even from a purely psychological point of view we can hardly agree that sensations of respiration and intercephalic, muscular adjustments are alone sufficient as elements of general consciousness, for as Ribot and others have pointed out coenaesthetic sensations, sensations coming from muscles, viscera, nerves, neurones, peripheral, central, and sympathetic nervous system, all enter as elements in the synthesis of consciousness. It may be claimed that the sensations pointed out by James may be predominant, but this is rather questionable. However the case may be, the identification of matter and mind, one being objective and the other subjective thought is an adventure into the realms of metaphysics.

James differentiates the fire that burns from the fire that does not burn, the water that is really wet from the water which is not wet, the motion that obeys the laws of mechanics from the motion that does not obey Newton's laws. In order to constitute water the chemist does not mix oxygen with his thought of hydrogen; in order again to constitute the idea of water the psychologist does not require tubes, retorts, so many volumes of gases of oxygen and hydrogen. The chemist does not put his ideas into his chemical compounds and the psychologist does not subject his mental states to chemical tests. It is only in metaphysics that the fundamental difference of mental states and physical objects can be explained away in one unitary experience.

I may add that James himself realized the truth of my contention, for in a private discussion with me he acknowledged that the view taken by him was purely metaphysical, that for the psychologist consciousness is as much of a reality as matter, atoms, molecule, ether, election, in short, as some form of material substance is requisite for the physicist.

Recently some neo-realists attempted to identify consciousness with energy and especially with that form of energy known as potential energy. Now we cannot possibly identify mental states and processes with physical forms of energy, whether kinetic or potential. Arthur Gordon Webster in his "Dynamics" points out: "Kinetic energy is of the dimensions $\frac{ML^2}{T^2}$ the same as those of work. Potential Energy is defined as work. The C.G.S. unit of energy is, therefore, the *erg*." If mental states or consciousness be potential energy of the physicist, the neo-realist should define it in terms of physical work. How many ergs are there in the ideas of virtue, goodness, and beauty? It is clear that if we use the term energy in the case of mental states or processes, we can do it only in a figurative way. Energy in psychology cannot be used in the same sense as the physicist uses the term in the case of kinetic or potential energy. One cannot take the mass of the idea and multiply it on the square of its length. Such a procedure is meaningless, it is therefore idle to talk of consciousness as potential energy. Energy is used in mental life as a figure of speech, as an illustration or substitute taken from physical life, but energy and consciousness can not be identified. When we say that an argument is clear, we do not mean that there are no particles of dust in it, or that we can use it as a medium through which we can see objects distinctly; or when we say of a stupid person that he is dense, we do not mean that he has a high specific gravity. Consciousness is not physical energy.

It is, however, quite possible that the potential energy-consciousness of the neo-realist is neither the potential energy of the physicist nor the consciousness of the psychologist. In this case we once more deal with some general metaphysical unifying substratum akin to the "pure experience" of James or to the "unitary experience" of Wundtian Voluntarism; in other words, we deal here again with metaphysics and not with science. One cannot help agreeing with Calkins: "Of late years vigorous attempts have been made to eject the term consciousness from our vocabulary, but, in my opinion, these efforts, though richly significant, are metaphysical, not psychological, since all are mainly concerned to overcome the dualistic opposition of psychical to physical. For whether accurate or inaccurate, the attempt to balance the account of thought and thing, that is, to distinguish psychical from physical, is concerned with the problem of ultimate reality, not with the explanation and description of observed facts, and is therefore metaphysical, not scientific in character."

While on the one hand there is danger that psychology, dealing with mind, experience, knowledge, is apt to fall into epistemological and metaphysical pitfalls, on the other hand there is grave danger on the side of physiologists and biologists to identify psychic facts with physiological and biological facts. Recently students of animal life have made violent efforts of merging psychology into biology. There is no doubt that motor reactions, adjustments, adaptations, behavior must be taken into consideration in the study of psychic facts, but motor manifestations are of psychological significance only in so far as they lead to an interpretation of the inner subjective facts, facts of consciousness. *This knowledge can only be given through an introspective interpretation of the facts of behavior.*

We can fully realize the non-psychological attitude when we find writers like Watson who wish to eliminate ideas or kindred mental states from psychology, or who like McDougall define psychology as a science of animal behavior. The peristaltic movements of the intestines, the action of the heart, the lungs and the liver belong to animal activities and still they can hardly be included under psychic activities. McDougall thinks that "psychologists must cease to be content with the sterile and narrow conception of their science as the science of consciousness, and must boldy assert its claim to be the positive science of the mind in all its aspects and modes of functioning, or as I would prefer to say, the positive science of conduct or of behaviour." But even from McDougall's standpoint mere movements do not constitute psychological material, they are psychological in so far as they are the indications of some inner subjective experience, such as sensations, feelings, emotions, strivings, conations. Now it is just these phenomena that form the subject matter of psychology. The psychologist regards behavior as the means for an introspective comprehension of what that behavior may indicate subjectively.

Psychology, even from McDougall's standpoint, is after all the science of the mind, the science of consciousness which we can study through an introspective interpretation of motor reactions or behavior. Knowing introspectively what fear is from our own introspection and from the observation of the motor reactions the instinct of fear gives rise to we can interpret similar reactions or behavior in our neighbor or in our lower kin in the scale of evolution.

It is interesting to observe that while on the one hand McDougall and others put motor reactions, conduct among psychic phenomena, on the other hand pure motor phenomena and physiological activities with but the rudiments of psychic life are described "in terms of the three aspects of mental life of all mental processes—the cognitive, the effective and the conative,'' terms which are really characteristic of the higher forms of mental life. According to McDougall even "the lower animals perceive, feel, and act." This reminds one of Binet's micro-organisms possessing perception, feeling, and volition.

APPENDIX II

PHYSIOLOGICAL TRACES

My attention was called to a very valuable paper "Further Studies in the Chemical Dynamics of the Central Nervous System," by T. Brailsford Robertson, published in the "Folio Neuro-Biologica" Band VII, 1913. Robertson advances an extremely interesting hypothesis based on his bio-chemical researches. Basing himself on the fact that "the performance of mental work *initially* facilitates its further performance and subsequently depresses or fatigues it," he builds up a far reaching chemico-physiological hypothesis of the main phenomena of normal and abnormal mental life. I quote freely from his paper as it is of importance and highly stimulating to those who wish to go into the more technical scientific details of physiological research in regard to the phenomena of normal and abnormal mental function.

"We meet therefore in the exercise of a given intellectual function with two apparently contradictory facts. Performance *facilitates* the exercise of the function and it likewise *depresses* the exercise of the function. We note furthermore that the facilitation and depression become evident at different periods of time, the former in the earlier and the latter in the later stages of performance. Now this phenomenon is not at all limited to the functions of the central nervous system. It is displayed in a very striking way by a variety of other functions, for instance in the contraction of the muscles in response to stimulation, whether direct or indirect. The phase of facilitation is displayed initially in the well known 'staircase phenomenon' and the phase of depression by rigidity and inability to contract to stimuli in response to stimuli which formerly evoked a maximal response. Again, as I have shown in a series of communications, a similar phenomenon is displayed in growth which initially undergoes acceleration and thereafter slows down. Indeed acceleration and slowing may alternate a number of times in the same organism producing what I have termed 'growth cycles.' This type of phenomenon would appear very generally displayed in the performance of life-activities, and indeed I am inclined to think with Loeb that the self conserving character of the life-process will ultimately find its solution in the study of phenomena of this description."

This principle of "growth cycles" is significant, inasmuch as it falls in line with the fundamental principle of reserve energy developed by James and myself from different standpoints.

Robertson assumes the presence of physiological traces. "If the central nervous system conditions these phenomena at all, as we believe it does, then the passage of a stimulus through the central nervous system must lead through a changed condition which for the sake of forming a concrete image we may term in the language employed by Maudsley, the deposition of a trace or in the terminology of Exner, the excavation of a channel (Bahnung) . . . The dynamic conception of trace formation regards it as being due to a *chemical alteration of cell-material along the path of the trace.'* We have seen that trace formation is at first facilitated by the process which brings it about and later depressed. . . . At first a stimulus passes over the 'trace' more readily, because it has previously done so, but at a later stage it passes over it less and less readily until finally the resistance is so great as to almost inhibit its passage altogether. Recalling this fact we find ourselves in a position to crystallize our problem and state it in the following terms: 'What is the nature of a chemical reaction which at first takes place the more readily in consequence of having previously taken place, but at a later stage is inhibited by its own progress?' When this question is addressed to a physical chemist he does not hesitate in replying: 'The reaction is either catenary (consists of two reactions the second of which uses up the product of the first) or it is autocatalytic, i. e. one of the products of the reaction accelerates the reaction.' *No other chemical reactions are known to the experience of the chemist which display at any stage positive acceleration.*"

The various experimental works carried out by Robertson lead him to the rejection of catenary reactions and to the assumption of autocatalysis. Basing himself on this hypothesis of autocatalysis Robertson goes on to explain from a purely chemicho-physiological standpoint the phenomena of memory, of amnesia, of hypnosis and of allied phenomena.

"Adopting the working hypothesis outlined above, we perceive that the canalisation hypothesis of Exner can now be expressed in a much more definite and concrete form. Each incoming stimulus carves out for itself in the central nervous system or deepens a pre-existing channel in the central nervous system, but the channel is not a trough formed by the physical displacement of particles, it is a chemical channel, a thread or trace of the autocatalyst of central nervous activities, a thread which need not necessarily be supposed to be more than a few times the diameter of 'the sphere of molecular influence' in width. This deposit necessarily follows faithfully the path pursued by the original impulse and permits succeeding impulses to pass over the same path more readily by virtue of its presence. It is possessed of course of a definite spatial location, but, and this is a very important point, if by any chance it should be obliterated or destroyed it is not irreplaceable even if the continuity of the original path be forever interrupted. For it is only one of a conceivably enormous number of paths which might be traversed by a stimulus in its passage from one extremity of the original path to the other. Furthermore, the trace is capable of being traversed by other subsequent or performed traces in as many different ways as the axons and ganglion cells of the central nervous system intercommunicate, that is, so far as our knowledge extends, in a number of ways which for all practical purposes may be regarded as infinite.

"It must always be remembered that the trace consists of a deposit of an autocatalyst which we are obviously compelled to assume is an autocatalyst for the propagation of *all* impulses. It follows, therefore, that if a faint trace runs into, that is to say, traverses or intersects a well-marked trace, there will be a tendency for the impulse forming or following the faint trace to be deflected completely at or in a great part into the well marked trace. Indeed if the intersecting trace be sufficiently well marked and formed subsequently to the faint trace, we can see how impulses now arriving by way of the faint trace would become so largely deflected into the new well marked trace as to leave the parts of the faint trace remote from the point of intersection almost untraversed by any impulses at all. Instances of the mental correlates of these physico-chemical phenomena abound in our daily psychic life."

In our next book on "Symptomatology" we shall refer to Robertson's application of his theory to the various phenomena of hypnosis, multiple personality, amnesia and various forms of dissociation. I wish here to call attention to Robertson's valuable paper and point out his relation to the hypothesis of unconscious cerebration on the one hand and to my psycho-biological doctrines of the moment-consciousness on the other.

Robertson fully realizes the shortcomings and crudeness of the physiological theories advanced by many physiologists to the effects of crowding out mental phenomena or consciousness, the very phenomena which the physiological theories were constructed to explain physiologically or rather to follow out physiologically step by step. As I have insisted in this volume a physiological correlative must be postulated for all phenomena of consciousness. This however is far from denying the mental facts themselves and thus being left with a physiological hypothesis instead of the facts themselves for which this hypothesis was constructed. When a physiologist or biologist constructs a physiological hypothesis as a correlative of consciousness he is so carried away with it that he soon forgets the purpose of the hypothesis and proceeds to deny the main facts. From a purely scientific standpoint we must postulate that each and every act of experience, of consciousness has a physiological correlative, a point on which I have laid special stress. The reasoning of a Newton, Aristotle, and Plato as well as the moral thoughts and feelings of prophets and saints have their physiological correlatives. This however would not mean that all those experiences of genius, intellectual and moral, are unconscious cerebrations devoid of all conscious awareness. Under such conditions it is best to stick to the facts and regard the physiological hypothesis as a pretty speculation which may do more harm than good, inasmuch as it distracts the attention from the facts at issue.

What I claim is that a good deal, if not the most of what is described as subconscious, is essentially of the same inner, subjective experience of what we otherwise describe as conscious awareness, inasmuch as introspective experience, both direct and indirect, given by immediate experience and by memory, as well as by reactions and behavior are the same as found in fully conscious states. If we deny awareness to subconscious manifestations, such as hypnosis and allied states, we should also call in question the awareness of all other similar states. It goes without saying as I have pointed that hypnosis and allied states being phenomena of consciousness must have a physiological correlative, but it is still to be proven that in such states there is only a physiological process without any conscious accompaniment. We may as well claim that the Iliad, Hamlet, the Principia, the Parthenon, Venus de Milo and other creations of genius are the result of physiological processes. In a certain sense the claim is true, there is a physiological correlative to the highest flight of genius, but it is manifestly absurd to omit the conscious elements that go to constitute the very essense of what we regard as genius. Conscious and subconscious phenomena have alike physiological correlatives and both of them are characterized by consciousness, awareness, and feeling.' *The subconscious is a consciousness, an other-consciousness, a consciousness other than the usual personal consciousness.*

Robertson is fully aware not only of the crude attempts of what he terms static physiological theories, but also of the fallacy of denying consciousness and installing in its place physiological currents, traces, and deposits. "It must be admitted" he says, "that the sporadic attempts which have been made from time to time by biologists to advance interpretations of the physical correlates of psychic phenomena have seldom been either well judged or attended by any measure of success." In another place he says; "The static conception as that developed by Munk and Ziehen, regards the 'trace' as some structural modification, some physical alteration, an alteration in other words in the distribution of cell-matter in space. I have elsewhere dwelt rather at length upon the more manifest objections to this point of view, at least in the crude form in which it has hitherto been presented. It would require each idea, mental image and conception to be very strictly localized. Such a localization of ideas has, of course, never been demonstrated."

The "trace" is conceived by Robertson in dynamic terms. This dynamic "trace," the correlative of memory, conscious and subconscious, is more or less permanent, because "the persistence of memories proves that the 'trace,' whatever it may be is rather permanent and only very slowly fades away."

Robertson fully realizes the importance of the subconscious for the conscious activity. "The phenomena of subconscious memory reveal clearly that memories may persist from childhood to advanced maturity without intermediate self-conscious recollection to reinforce the trace. Occasional subconscious recollection cannot of course be ruled out, but it must be rare in many cases, for otherwise, as Sidis has pointed out, our entire mental life would be occupied in recollecting."

In speaking of the static physiological theories Robertson says: "Sidis proceeds to dispose of all these theories collectively on the ground that a mere modification left behind as a trace cannot possibly explain, memory, recollection, the fact of referring a particular bit of experience to an experience felt before." Robertson fully sees the function of the physiological theories as correlatives of conscious states, not as substitutes. He realizes fully that the function of a good physiological theory of the physiological correlatives of conscious states is not the ruling out of the subjective phenomena which after all form the real material of investigation. He assumes the presence of consciousness as a datum to which he wishes to find a physiological correlative. "Such criticism" he goes on to say "is perfectly sound, if these theories are seriously advanced as 'explanations' (rather as substitutes as I would say considering the hypothesis of the subconscious advanced recently by some writers on the subject) of *the subjective experience* of memory. A subjective experience of recollection can no more be identified with a physical modification of a nerve element than the subjective experience of a given color can be identified with a particular wave length of light. But I submit that regarding memory from an objective standpoint as a *pure objective fact* (modification of the present as a result of previous reactions to stimuli) it demands objective interpretation with precisely the same force as any other objective fact."

That memory has physiological correlatives we must regard as one of the fundamental assumptions of psychology, both normal and abnormal. What I protest against is the metaphysical "Unconscious" which claims to take the place of subjective facts. The Unconscious (with a capital U) as formulated by Carpenter, Ziehen and by other modern writers, under the belief and possibly with the good intention of being more scientific, introduces Hartmanian metaphysics of the marvels of the Unconscious into psychic life. We must remember once for all that "deposits of images in memory ganglion cells," "unconscious dispositions," "neurograms" and other kinds of figurative representations, are in the last resort figurative images which may help to picture the possibility of physiological correlatives of psychic states, but they cannot, from their very nature, replace the real facts, the facts of consciousness. As soon as such claim is made by the "Unconscious" it must be declared to be what it really is, namely a speculative hypothesis of certain mental phenomena which alone constitute the real facts.

Perhaps it is in place to add a few words as to the hypothesis of autocatalysis in relation to what Robertson discusses as Sidis' hypothesis of neuron disaggregation Robertson thinks that the theory of neuron disaggregation stated from the standpoint of neuron retraction should be abandoned. It seems to me however, that the theory of neuron disaggregation or of systemic neuron disaggregation does not depend on the theory of neuron retraction. The latter is provisional. *Systems of functioning neurons may be thrown out of association due to changes of their thresholds.* This rise and fall of threshold developed in my *Multiple Personality* puts the hypothesis of neuron disaggregation on a more solid and more certain physiological basis.

In fact the rise and fall of thresholds of neuron systems may be very well stated in Robertson's own hypothesis of autocatalysis. The theory of the rise and fall of thresholds is based on a series of known physiological and psychological facts. It is quite possible that the rise and fall of thresholds which gives rise to neuron disaggregations with its accompanying phenomena of dissociation are ultimately due to changes in the formation of systems of autocatalytic products. Should the latter hypothesis be proven I think the theory of neuron disaggregation would rest on a sure chemico-physiological basis.

The theory of neuron disaggregation may well be stated in Robertson's theory of autocatalysis correlative with psychic phenomena. In fact, Robertson himself calls attention to the fact that his theory does not fundamentally clash with mine, the two may in fact be in full accord. "Abandonment of the postulate of neuron disaggregation," (rather neuron retraction) Robertson concludes his paper, "does not in the least involve, however, rejection of the really essential features of Sidis' hypothesis of 'moment consciousness.' My hypothesis does not traverse the hypothesis of Sidis; it merely supplements it and renders necessary a readjustment of the physiological equivalents of his terminology. From Sidis' point of view the full waking consciousness may be likened to a pyramid having for its base a greater or smaller number of 'moments consciousness.' From my point of view it may be likened to a complicated textile fabric built up out of the psychical correlates of a greater or smaller number of interconnected traces. It is obvious that for the purpose of purely psychological analysis the two hypotheses are almost completely interchangeable; but for Sidis' 'moments consciousness' we must read not 'neurones,' but 'traces,' 'channels,' or 'deposits of autocatalyst.'"

The criticism passed on Robertson's theory that it fails to account for conservation of memory is unjustified. Robertson's theory is fully adequate to explain conservation of memories.

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